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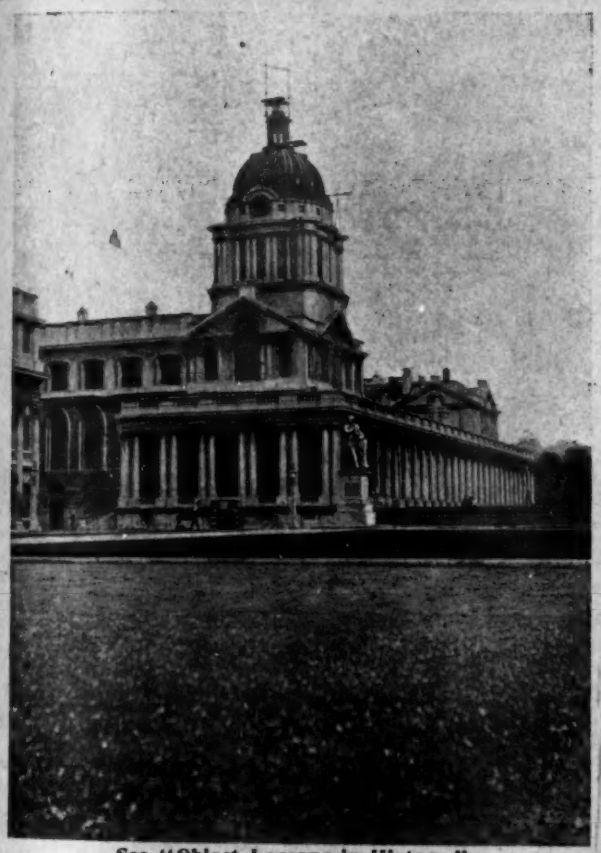

See "Object-Lessons in History."

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VOL. XXVI No. 4

EDITORIAL, PUBLISHING AND ADVERTISING OFFICES OF "THE PRACTICAL TEACHER"
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THE

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A MONTHLY MAGAZINE AND REVIEW

FOR THE SCHOOL-ROOM AND THE STUDY

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SCHOOL THROUGH TRAVEL

BY J. H. YOXALL

"LES voyages forment la jeunesse," say the French, and it is true. I have recently been privileged to accompany three children on a tour in France, acting as their courier and banker, their guide, philosopher, and friend. Not a step did we take, not a kilomètre did we ride, but something came into view to cause the spontaneous question, the arguments *pro* and *con*, and then the recourse to the elders, which seem to me the very essence of good educational methods. Travel is indeed the most delightful and efficient of all schools. Why did we not all go to school in travel? The three stood beside a tomb in Rouen Cathedral; "Henricus II., Cor-Leonis dicti frater" was graven on the cenotaph. The girl of fourteen translated the imperfect Latin; the boy of eight said that Cœur-de-Lion *wasn't* the brother of Henry the Second; and the girl of eleven said, "Oh yes, he was!" and gave historical reasons for so thinking. From that moment we hunted (all of us) for Latin inscriptions with the zest of a brass-rubber, and Latin will never be a meaningless infliction for any of the three again.

We entered the port of Havre at the same moment as a torpedo-boat, and the mysteries of the Whitehead tube, as well as of the movement of the screw, were revealed to the naked eye, for the scuppers were well awash. We mounted on *La Bretagne*, a French Atlantic liner, entered the saloon, noted the "fiddles" on the table, and took momentary repose in stateroom berths. An ocean voyage was realised to our youthful minds immediately by all that. The ship had been in port two days, she was to depart again on the morrow; the endless movement of these shuttles of the ocean became evident to our juvenility, and we realised the flashing of ships to and fro across the Atlantic in a flash.

We mounted to the lighthouses on Cap de la Hève, examined the fixed light and then the rotary one. No lesson on optics could have been so illuminating as the sight of the huge lenses, ribbed, crystalline, parabolic, and what not. At Caudebec *le mascaret* dashed its spray upon us; we heard it first, in the night, coming like troops of galloping dragoons, along the river-bed, and when we had seen it also, the true meaning of a "bore," and the tidal and configurational causes of a bore, became instilled in our heads in the least possible bore-ing way.

At Jumiéges we saw what Norman architecture in its massive enormousness could mean; at Coutances the transition into Gothic; at Rouen and Coutances the transition into the Flamboyant and the Renaissance styles. Caen showed us "Norman" again, and the eleventh-century church-door at Mortain revealed in perfection the shark's-tooth moulding and the round arch of Norman days. Before many days were over we could all distinguish in a composite church where the Norman left off and the Gothic began. Then the affiliation of the Norman with the Roman became obvious to us, because what we call "Norman" in architecture the French (with their natural definitiveness) insist on calling "Romain."

The region that flanks the river Orne, in its timbered style of house-building, its hedges, its farming, and its general aspect, reminded us so much of Worcestershire and other English counties south of the Trent that we could not but understand how Normanised our England was for many centuries. "There is something about that in a very fine book at home," one of the elders said, and, reaching home, the "Short History of the English People" was opened. "The very look of the country and its people seem familiar to us; the peasant in his cap and blouse recalls the build and features of the small English farmer; the fields about Caen, with their dense hedgerows, their elms, their apple-orchards, are the very picture of an English countryside. On the windy heights around rise the square grey keeps which Normandy handed on to the cliffs of Richmond or the banks of the Thames, while huge cathedrals lift themselves over the red-tiled roofs

of little market towns, the models of the stately fabrics which superseded the earlier churches of Aelfred or Dunstan," the children read; and at once the fact that a history-book need not be a dry school-book was revealed to them in surprise.

Joan of Arc—at Rouen we realised her and pitied her; one of us had wet eyes for her; and hunting about promiscuously in a wood at Montfort-sur-Risle we discovered a ruined fortress, in such a condition as Joan must have left the walls she stormed and the fortifications she reduced. But at Fougères we could walk about the interior of a "real big castle," once the strongest in Brittany, and mark the "outer bailey" and the "inner bailey," the corbels that upheld the machicolations, and the slits down which the boiling oil and molten lead were poured upon the assailants swarming in the fosse. So also, driving out from Lisieux, we found in the gatehouse of the Château de Fervacq the drawbridge and the portcullis still extant, and "You must read the siege in 'Ivanhoe' when you get home," was said to the youngsters, and they did. The boy could defend a feudal castle himself to-day, he feels; and on the sands at Carteret the boy and the younger girl proceeded to construct one.

Mysteries of agricultural life became revealed to our towny eyes. We did not actually see a pig killed, but we saw one being singed. Young pigs in crates strewn all about market-places amused us mightily; maize we saw growing in the fields, and buckwheat, and tasted buckwheat cake at Mortain. Lizards scurried away from us at Thury-Harcourt, and we made acquaintance with goats and sheep and donkeys galore. Never was such Nature-study as ours; and mechanics we examined in windmills, watermills, punts, canoes, and oars. From Pont Audemer we rowed out with the tide, easefully and proudly that we could row at all; but when it was time to return, oh, the labour of "rowing against the stream," the futility of it, and the eventual need to cast out the tow-line and learn something about propulsion along canals. Railways and locomotives yielded up their secrets, for in France you meander about the rails at stations, unhindered by platforms, and French railway engines wear all their viscera outside; so that we became, in our own opinions, qualified to drive an express or act in a signal-box; while as for the physics and physiology involved in the act of swimming, we learned it in the sea to the full.

We drove into "la Suisse Normande," found out for ourselves why they call it that, and, catching a pile of white cumulus in apparent rest above the peaky hills, we got a picture, a model, a vivid conception of what the real Switzerland is like. We watched the art of pillow-lace making, saw women at the spinning-wheel, and compared that simple instrument with the great looms in the cotton factories on the other bank of the Seine from Rouen. Motor-boats we tested, between St. Malo and Dinard; saw a ruined paper-factory and forty empty houses in the lovely valley near Sourdeval, and realised what the competition of huge capital and steam may mean to industries that depend on simpler motive powers. We saw the cider-press at work, the horse at the wheel, the sailors at the capstan; heard the steam-thresher, studied the methods of road-mending and the use of the theodolite; saw the great straight white roads diverge from the circumference of the noble hill at Avranches; and studied the flux and reflux of the tides at Mont St. Michel itself.

Marine creatures became our prey (for study-purposes and also eating) in the rock pools under Cape Carteret and the *roches noires* near Trouville. "Now you must read George Sand's 'Wings of Courage' again," was said. We saw the tufted sea-birds with which that excellent story deals; bird-life in many manifestations added to our lore. Into the café at Falaise was brought a freshly shot specimen of the falcon-bird which used to ride on my lady's wrist, and it made a text for a talk about hunting. In the wood near Fervacq we saw the haunts of the *sanglier*, the tree-trunks on which he had recently sharpened his tusks, and the soil he had cast up about his den only the day before. We discovered adders, and killed them, *pro bono publico;* and as for apples, pears, peaches, plums, blackberries, and grapes, we discussed them with a more than scientific eagerness. Geography we studied on the spot and in the real, map in hand as we rode; and to-day a map is a picture to us all.

Now I submit that all this was very good schooling indeed for the children, and the elders too, for the matter of that; and the best of it was that we none of us recognised that we were at school. We thought then and we think now, that we were having a royal holiday, and nothing would have surprised us more than to be told that we were educating ourselves very learnedly too. Yet lest the travelling-school should seem to the reader to be all school, let me say that on the sands we played cricket, batting with a wooden spade; also hop-scotch; and that along the splendid hard white roads of France we played the ancient game of tip-cat; to the astonishment and envy of the young natives, in each game.

But, most important and local of all, perhaps, we studied the French language unconsciously; roots, derivatives, and modifications of French and French-Latin in English were brought to our minds by sign-boards, advertisements on hoardings, names of stations, names of villages and men, and so forth. We saw, for instance, a connection between *magasin* and "magazine," between *vue générale* and "general view"; and, slowly, timidly, but in the end with some courage and success, even the youngest of us began to use the local language. We crossed the Channel homeward in a stiff gale, that taught us to regard with equanimity henceforward all sea-weather but some of the worst; and even the pitching, rolling, tossing, swooping, and generally switchback-like behaving of the boat all the way from Havre could not make us render up the knowledge, the education, the health, or the pleasure we had gained.

Yes, "les voyages forment la jeunesse," and there is no such school as travel. It is a cheap school, too, if you know how to go about it, putting enough but not too much money in your purse, and bargaining at inns before you take up quarters in them, and always getting a shilling's worth out of a franc. So hey for the travel-school! hey for unconscious learning! And thrice hey for la belle France!

The President of the Board of Education, the Marquis of Londonderry, K.G., has appointed Mr. A. B. Skinner as Director of the Art Museum at South Kensington, to succeed Sir Gaspar Purdon Clarke on his resignation of the post. The Board are considering the advisability of making new arrangements in regard to the relations between the Council of Advice for Art and the work of the Art Museum, with a view to enlarging the scope and functions of the Council, and at the same time extending the responsibilities of the Director in certain directions.

BRITISH MUSEUM

BY MANY HANDS.

"Quot homines, tot sententiæ."

WE must not be too sanguine, but it would almost seem that common-sense is going to occupy an adequate position in the mandates of the Board of Education. "Suggestions for the consideration of Teachers and others concerned in the work of Public Elementary Schools" is a document which well repays an outlay of eightpence with His Majesty's Stationery Office. There is a definite and whole-hearted recognition by the Board that teachers are capable of thinking for themselves, and of taking the initiative should the occasion justify it. The Board not only give the teacher liberty to think, but they ask for the result of his cogitations, and for a report upon his experiences, wherever the same may be helpful to the schools at large. Having surveyed our old friend "Revised Instructions" under this new guise however, it is quite clear that the nation, through its Board of Education, demands more of its teachers than its Cabinet Ministers.

WHAT do these "suggestions" suggest a teacher should be? Of high personal character, high individual intelligence, a student of human nature, and an intellectual analyst, a specialist on the development of character, a disciplinarian, a combined judge and jury, a registrar, a diarist, an inspector, a moralist, a philosopher, with a little thought-reading thrown in, a musician, an artist, a sanitary inspector, a drill sergeant, a handicraftsman, a gardener, and the possessor of other little accomplishments unnecessary to detail. Mesmerism and motoring are not specifically mentioned, but doubtless we shall see these in the next blue-bound "suggestions" which appear.

IT is quite clear, however, that the Board of Education ask the teacher for a display of common-sense, to which the profession will readily respond, glad to bestow the benefit of such an excellent trait upon a Government department. It makes one feel quite cheery and optimistic, for who knows, we may yet live to see common-sense dominating the Code itself—but that were optimism run mad.

IN the "Prefatory Memorandum," the Board expresses the view that "all teachers would profit by access to a library well furnished in what may be described as pedagogic literature." "Pedagogic literature" is good. It likes us well. As most teachers have a heavy surplus from their salaries after paying rent, rates, household expenses, and meeting other necessary requirements, they will doubtless lay in a heavy stock of "pedagogic literature," for in the majority of instances this would be the only means of "profiting by access" to this desirable mental stimulant. The "Memorandum" goes on to say in truth: "But only a limited number of teachers can avail themselves of such methods of keeping abreast in educational progress."

THUS the Board of Education casts reflections upon itself. Whose business is it to see that the teacher *has* access to literature by which they, and consequently the nation, would profit? As far as we understand "pedagogic literature," it is beyond the slender means of the teacher; and it is the duty of the authorities to provide the teacher with the means of storing his mind. "Pedagogic" libraries are one of the needs of the moment. The teacher should be in a position to "keep abreast" of other things beside educational progress. Our past systems have tended to make the teacher merely a scholastic machine. To use a colloquialism, the teacher has been too "shoppy," too much wrapped up in departmental requirements and regulations, to be *au fait* with what the world was doing generally. If the Board of Education, however, intend the teacher of the future to be a person of wide general knowledge and experience, there will have to be "access" to several other things besides "pedagogic literature."

WE have perused with interest Chapter IV. of "Suggestions," which deals with the teaching of English. The Board are of opinion that "the teaching of the mother tongue is the most important part of school instruction." Agreed! It must be conceded, however, that the localisation of the "mother tongue" is an almost impenetrable barrier. It is the mother's tongue at home, which renders much of the teacher's effort of no avail. There is one point, however, which is worth noting in this connection. There is a danger that the teacher may accept the local version of the mother tongue as something inevitable. Provincialisms are difficult to uproot, but they should be persevered with and uprooted, for although there has been some decay in dialects, it is fairly easy to tell from which part of the country a person hails by his speech.

CANON HORSLEY, rector of St. Peter's Parish, Walworth, S.E., is engaged upon a crusade which will keep the reverend gentleman busy for some time; he has our best wishes for his success. In his parish magazine, the Canon says: "For many years I have tried to get successive generations of girls in our schools to see the difference between the Walworth and the English tongue by writing on the blackboard some sentences according to its Walworth pronunciation, and then inviting them to write the English thereof underneath." The examples given by Canon Horsley are unique, of which the following may be quoted:—

"Binter tiker rome" (Been to take her home).
"Binnavinagime" (Been having a game).
"Ow, shy cans" (Oh, shake hands).
"Rowzis lite" (Rose is late).

THE worthy rector has laboured hard and often to get the pronunciation of "baby," but the Walworthians will have it "biby." He says that even his

of little market towns, the models of the stately fabrics which superseded the earlier churches of Aelfred or Dunstan," the children read; and at once the fact that a history-book need not be a dry school-book was revealed to them in surprise.

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Mysteries of agricultural life became revealed to our towny eyes. We did not actually see a pig killed, but we saw one being singed. Young pigs in crates strewn all about market-places amused us mightily; maize we saw growing in the fields, and buckwheat, and tasted buckwheat cake at Mortain. Lizards scurried away from us at Thury-Harcourt, and we made acquaintance with goats and sheep and donkeys galore. Never was such Nature-study as ours; and mechanics we examined in windmills, watermills, punts, canoes, and oars. From Pont Audemer we rowed out with the tide, easefully and proudly that we could row at all; but when it was time to return, oh, the labour of "rowing against the stream," the futility of it, and the eventual need to cast out the tow-line and learn something about propulsion along canals. Railways and locomotives yielded up their secrets, for in France you meander about the rails at stations, unhindered by platforms, and French railway engines wear all their viscera outside; so that we became, in our own opinions, qualified to drive an express or act in a signal-box; while as for the physics and physiology involved in the act of swimming, we learned it in the sea to the full.

We drove into "la Suisse Normande," found out for ourselves why they call it that, and, catching a pile of white cumulus in apparent rest above the peaky hills, we got a picture, a model, a vivid conception of what the real Switzerland is like. We watched the art of pillow-lace making, saw women at the spinning-wheel, and compared that simple instrument with the great looms in the cotton factories on the other bank of the Seine from Rouen. Motor-boats we tested, between St. Malo and Dinard; saw a ruined paper-factory and forty empty houses in the lovely valley near Sourdeval, and realised what the competition of huge capital and steam may mean to industries that depend on simpler motive powers. We saw the cider-press at work, the horse at the wheel, the sailors at the capstan; heard the steam-thresher, studied the methods of road-mending and the use of the theodolite; saw the great straight white roads diverge from the circumference of the noble hill at Avranches; and studied the flux and reflux of the tides at Mont St. Michel itself.

Marine creatures became our prey (for study-purposes and also eating) in the rock pools under Cape Carteret and the *roches noires* near Trouville. "Now you must read George Sand's 'Wings of Courage' again," was said. We saw the tufted sea-birds with which that excellent story deals; bird-life in many manifestations added to our lore. Into the café at Falaise was brought a freshly shot specimen of the falcon-bird which used to ride on my lady's wrist, and it made a text for a talk about hunting. In the wood near Fervacq we saw the haunts of the *sanglier*, the tree-trunks on which he had recently sharpened his tusks, and the soil he had cast up about his den only the day before. We discovered adders, and killed them, *pro bono publico;* and as for apples, pears, peaches, plums, blackberries, and grapes, we discussed them with a more than scientific eagerness. Geography we studied on the spot and in the real, map in hand as we rode; and to-day a map is a picture to us all.

Now I submit that all this was very good schooling indeed for the children, and the elders too, for the matter of that; and the best of it was that we none of us recognised that we were at school. We thought then and we think now, that we were having a royal holiday, and nothing would have surprised us more than to be told that we were educating ourselves very learnedly too. Yet lest the travelling-school should seem to the reader to be all school, let me say that on the sands we played cricket, batting with a wooden spade; also hop-scotch; and that along the splendid hard white roads of France we played the ancient game of tip-cat; to the astonishment and envy of the young natives, in each game.

But, most important and local of all, perhaps, we studied the French language unconsciously; roots, derivatives, and modifications of French and French-Latin in English were brought to our minds by sign-boards, advertisements on hoardings, names of stations, names of villages and men, and so forth. We saw, for instance, a connection between *magasin* and "magazine," between *vue générale* and "general view"; and, slowly, timidly, but in the end with some courage and success, even the youngest of us began to use the local language. We crossed the Channel homeward in a stiff gale, that taught us to regard with equanimity henceforward all sea-weather but some of the worst; and even the pitching, rolling, tossing, swooping, and generally switchback-like behaving of the boat all the way from Havre could not make us render up the knowledge, the education, the health, or the pleasure we had gained.

Yes, "les voyages forment la jeunesse," and there is no such school as travel. It is a cheap school, too, if you know how to go about it, putting enough but not too much money in your purse, and bargaining at inns before you take up quarters in them, and always getting a shilling's worth out of a franc. So hey for the travel-school! hey for unconscious learning! And thrice hey for la belle France!

The President of the Board of Education, the Marquis of Londonderry, K.G., has appointed Mr. A. B. Skinner as Director of the Art Museum at South Kensington, to succeed Sir Gaspar Purdon Clarke on his resignation of the post. The Board are considering the advisability of making new arrangements in regard to the relations between the Council of Advice for Art and the work of the Art Museum, with a view to enlarging the scope and functions of the Council, and at the same time extending the responsibilities of the Director in certain directions.

BRITISH MUSEUM

BY MANY HANDS.

"Quot homines, tot sententiæ."

WE must not be too sanguine, but it would almost seem that common-sense is going to occupy an adequate position in the mandates of the Board of Education. "Suggestions for the consideration of Teachers and others concerned in the work of Public Elementary Schools" is a document which well repays an outlay of eightpence with His Majesty's Stationery Office. There is a definite and whole-hearted recognition by the Board that teachers are capable of thinking for themselves, and of taking the initiative should the occasion justify it. The Board not only give the teacher liberty to think, but they ask for the result of his cogitations, and for a report upon his experiences, wherever the same may be helpful to the schools at large. Having surveyed our old friend "Revised Instructions" under this new guise however, it is quite clear that the nation, through its Board of Education, demands more of its teachers than its Cabinet Ministers.

WHAT do these "suggestions" suggest a teacher should be? Of high personal character, high individual intelligence, a student of human nature, and an intellectual analyst, a specialist on the development of character, a disciplinarian, a combined judge and jury, a registrar, a diarist, an inspector, a moralist, a philosopher, with a little thought-reading thrown in, a musician, an artist, a sanitary inspector, a drill sergeant, a handicraftsman, a gardener, and the possessor of other little accomplishments unnecessary to detail. Mesmerism and motoring are not specifically mentioned, but doubtless we shall see these in the next blue-bound "suggestions" which appear.

IT is quite clear, however, that the Board of Education ask the teacher for a display of common-sense, to which the profession will readily respond, glad to bestow the benefit of such an excellent trait upon a Government department. It makes one feel quite cheery and optimistic, for who knows, we may yet live to see common-sense dominating the Code itself—but that were optimism run mad.

IN the "Prefatory Memorandum," the Board expresses the view that "all teachers would profit by access to a library well furnished in what may be described as pedagogic literature." "Pedagogic literature" is good. It likes us well. As most teachers have a heavy surplus from their salaries after paying rent, rates, household expenses, and meeting other necessary requirements, they will doubtless lay in a heavy stock of "pedagogic literature," for in the majority of instances this would be the only means of "profiting by access" to this desirable mental stimulant. The "Memorandum" goes on to say in truth: "But only a limited number of teachers can avail themselves of such methods of keeping abreast in educational progress."

THUS the Board of Education casts reflections upon itself. Whose business is it to see that the teacher *has* access to literature by which they, and consequently the nation, would profit? As far as we understand "pedagogic literature," it is beyond the slender means of the teacher; and it is the duty of the authorities to provide the teacher with the means of storing his mind. "Pedagogic" libraries are one of the needs of the moment. The teacher should be in a position to "keep abreast" of other things beside educational progress. Our past systems have tended to make the teacher merely a scholastic machine. To use a colloquialism, the teacher has been too "shoppy," too much wrapped up in departmental requirements and regulations, to be *au fait* with what the world was doing generally. If the Board of Education, however, intend the teacher of the future to be a person of wide general knowledge and experience, there will have to be "access" to several other things besides "pedagogic literature."

WE have perused with interest Chapter IV. of "Suggestions," which deals with the teaching of English. The Board are of opinion that "the teaching of the mother tongue is the most important part of school instruction." Agreed! It must be conceded, however, that the localisation of the "mother tongue" is an almost impenetrable barrier. It is the mother's tongue at home, which renders much of the teacher's effort of no avail. There is one point, however, which is worth noting in this connection. There is a danger that the teacher may accept the local version of the mother tongue as something inevitable. Provincialisms are difficult to uproot, but they should be persevered with and uprooted, for although there has been some decay in dialects, it is fairly easy to tell from which part of the country a person hails by his speech.

CANON HORSLEY, rector of St. Peter's Parish, Walworth, S.E., is engaged upon a crusade which will keep the reverend gentleman busy for some time; he has our best wishes for his success. In his parish magazine, the Canon says: "For many years I have tried to get successive generations of girls in our schools to see the difference between the Walworth and the English tongue by writing on the blackboard some sentences according to its Walworth pronunciation, and then inviting them to write the English thereof underneath." The examples given by Canon Horsley are unique, of which the following may be quoted:—

"Binter tiker rome" (Been to take her home).
"Binnavinagime" (Been having a game).
"Ow, shy cans" (Oh, shake hands).
"Rowzis lite" (Rose is late).

THE worthy rector has laboured hard and often to get the pronunciation of "baby," but the Walworthians will have it "biby." He says that even his

church choir sing "Dye by dye" for "Day by day," and "'Ark! the 'erald oingels sing" for "Hark! the herald angels sing." The Canon says that he wishes that all teachers could be roused to a sense of their responsibility. "Though no one appreciates the work of the school teachers in London more than I do," says he, "I have to confess that they are not immaculate in their pronunciation. They acquire what is known as the teacher's voice, with its shrill Board School intonation, its whining cadences, which are not helpful towards correct vowel pronunciation among the scholars."

WHILE admitting that the Canon is in a large measure correct in his deductions, we learn for the first time of an intonation peculiar to Board Schools. Does the reverend gentleman mean to argue that there is a "provided" and "non-provided" accent, and if so which does he approve, and why, and if not, why not? We do not wish, however, to worry Canon Horsley, as he is closely engaged with a puzzle just now. There's a school girl in Walworth whose name is a mystery. It is either Ada Payne, Ida Payne, Ada Pine, or Ida Pine, and the reverend Canon is still struggling with the problem. We would suggest finding the square root by painless extraction.

"NATURE Study," which in the old days we used to call "object lessons" (though there have, of course, been developments) is a branch of instruction which is invaluable as a means of developing the general intelligence. In the "Suggestions" we find mention of the country school and the seashore school, where the riches of nature may be studied; but we do not really find anything to practically assist nature study in Bethnal Green, Seven Dials, Limehouse, or Wapping. "In the schools of a large town, no matter how remote from the country, all our common food plants should be grown, and *e.g.* wheat, oats, barley, turnips, potatoes, clover, peas, and beans, &c., &c. The smallest plot of ground, even pots will suffice, and many lessons can be drawn as the growth proceeds."

WHILE appreciating on the whole very highly the 155 pages of "Suggestions," we venture to say that the gentleman who penned the foregoing quotation is either a humorist or somewhat inexperienced. There are very many districts where "the smallest plot of ground" is invisible to the naked eye, and as for the growing in pots, this would merely serve to demonstrate that indifferent light and bad air are as deleterious to plant life as to child life. This is not an unimportant lesson by any means, and the only difficulty is, that should the child subsequently see the cereals and root crops above specified under proper conditions he would not be able to recognise them from the Seven Dials brand from which he took his "Nature Study." It is a scandal and a disgrace that in this Christian land of ours to a large number of children the only nature study available is human nature, and that in its lowest and most revolting form. It is open to doubt, therefore, whether dyspeptic turnips or attenuated carrots, "grown in pots," would be a sufficient antidote.

THE scheme outlined in the "Suggestions" for teaching Hygiene and Temperance is admirable. We understand that Sir Michael Foster, M.P., and Dr. Hutchinson, M.P., have had a hand in this. The scheme is founded on common-sense, actual experience, and incontrovertible scientific facts. The adult population has shown a disposition in recent years to pay more regard to the laws of hygiene and the practice of temperance, and it is most essential, therefore, that the rising generation should be thoroughly grounded in the principles which are so vital to the real enjoyment of life. To enable the children to feel the joy of living is an object worthy of attainment, and indeed vital to the best interests of our race.

THE press in general have not given much attention to these "Suggestions," but especially in the case of the temperance teaching there are all the elements of a small revolution. It may be also that we shall see a new brand of passive resister. Should the brewer and the distiller study the "Suggestions," and develop conscientious objections to paying an education rate for the teaching of principles adverse to beer and whisky, it would be interesting to see them line up at the Police Court, to show cause why they should not pay the full rate. And if the more ardent spirits in the "Trade" went to prison in default of payment, how pleasant it would be for them to enjoy once more the company of their numerous *clientèle*.

N.U.T. NOTES.

The Exclusion of Children under Five.

POSSIBLY nothing quite so revolutionary in the educational world has transpired, during my eleven years' membership of the Executive, as the exclusion of children under five years of age from the primary schools. Though there is naturally a divided opinion at Russell Square on the subject, the great majority are in hearty accord with the Board of Education's proposals, and for many excellent reasons. Personally I support them strongly, and having once been in charge for some fifteen months of what was virtually an infants' school, I have had possibly a better opportunity of coming to a correct decision than most *men*, at all events. (Incidentally I might add that, in my humble judgment, it would not be half a bad thing were all teachers privileged to spend some portion of their professional career in observing the methods and wonderful resource of those in charge of children of the most tender years.) Children under five can be taught practically nothing, and I am glad to recollect that my talented former colleagues devoted most of their energies and abilities to giving the babies and the four-year-olds "a good time." I know everything that can be urged against shutting them out of the schools. I know that they spend their days in airy, well-lighted, well-warmed rooms, under the influence of kindly and intelligent teachers, and I recognise that, if excluded from the schools, they will be exposed to the dangers of the streets, and possibly run the risk of being burnt to death at home. Authorities can, however, as at Nottingham, make special regulations for the children in the very poorest districts of their administrative areas, and the above risks will then be minimised, if

not altogether obviated. Medical men seem to be agreed that the attendance at school of such young children is often accompanied by danger to health; and although teachers are not unanimous on this point, no one will deny the force of Mr. Morant's dictum that "there is also a mass of evidence pointing to the conclusion that a child who does not attend school before six years of age or more will, in general, compare favourably, at a later age, with a child whose attendance began at an earlier age." The substantial saving to the ratepayers through postponing the need for school extensions in many districts need not be elaborated here.

IN the early nineties, some years before I became a member of the Union's Parliament, I was an advocate, both by voice and pen, of the formation of a strong Sustentation Fund. Arrived at Russell Square, I found that the existent Reserve Fund was more than sufficient for every purpose to which such a Sustentation Fund as I had in view could be applied. It permitted us to sustain those teachers who were arbitrarily and capriciously dismissed from their offices; it made ample provision for the purpose of a series of systematised efforts to raise salaries in certain counties where the rates of remuneration were abnormally low; and it allowed a very large margin for any items of extraordinary and exceptional Union expenditure. The passing of the 1902 Education Act, however, by replacing an enormous number of small Educational Authorities by comparatively few large ones, called into existence an altogether new state of things. It was not particularly difficult for the Union to deal singly with erring School Boards or bodies of managers; but it is not quite so easy to maintain a successful struggle with an Authority which has several hundreds—and, in some cases, thousands—of teachers under its control, *with our present resources.* Without a doubt, the difficulty which arose, shortly before Easter, in East Ham, owing to its Education Committee refusing to administer the Act and issuing notices to the teachers to terminate their engagements, brought matters to a head, and led the Executive to consider to what extent they would be able to sustain the members of the Union in the event of any other Education Authority adopting a similar course. Very few months would witness the "passing" of the Reserve Fund, and it may even yet—although the East Ham cloud has for the time happily rolled away—be necessary to summon a Special Conference to obtain powers to make such levies as may be expedient. I sincerely trust this Conference will not be needed. The Executive will, however, as a measure of precaution, in all probability ask the Scarborough Conference to sanction a scheme which will ensure to every member of the Union, as a matter of right, adequate protection in his hour of need.

Wanted! A Strong "Sustentation Fund."

IN the past the honoured name of Mr. T. B. Ellery has rightly been associated with the subject of teachers' superannuation, and only those who were his Executive colleagues prior to 1898 are able to form an adequate conception of the stupendous amount of work done by him in getting the teachers' services even moderately recognised. His successor in the chair of the Parliamentary and Superannuation Committee is another ex-President of the Union, Mr. Marshall Jackman, whose financial and statistical genius is literally a wonder and a marvel to those who labour by his side. Genius, assisted by a veritable passion for work and "schemes," has enabled Mr. Jackman to discover an extraordinary saving on the Government's original estimate for pensions and "breakdowns," a saving so remarkable that I include below the table prepared by him for the Executive:—

Super-annuation.

Year.	Pensions.		"Breakdowns."		Savings on "Breakdowns."	
	Estimates.	Actual Expenditure.	Estimates.	Actual Expenditure.	Year.	Amount.
1900	£10,958	£6,304	£14,984	£4,882	1900	£10,102
1901	12,665	9,433	30,203	8,931	1901	21,272
1902	14,549	12,622	45,839	13,750	1902	32,089
1903	16,597	15,838	61,634	18,588	1903	43,046
1904	20,810	19,902	78,336	23,675	1904	54,661
Totals	£75,579	£64,099	£230,996	£69,826		£161,170

It will be noticed that there is a constant, increased saving of about £10,000 a year on the expenditure originally estimated for "breakdowns," and this fact is surely fairly conclusive that the estimates were based on wrong premises. Mr. Jackman's contention is that the teachers have a *moral*, if not a legal, right to the funds Parliament was, prior to 1898, prepared to vote; and the Executive, at his suggestion, are asking the Government to "increase the amount of the pension paid out of funds voted by Parliament, and that the increase be in the form of

"(*a*) Increasing the ten shillings to £1 for each complete year of service after the passing of the Act.

"(*b*) Increasing the threepence for men to sixpence and the twopence for women to fourpence in addition to increasing the ten shillings to £1 for back service."

The second demand is "that breakdown allowances be increased on the following plans:—

"(*a*) For men: £20 for the first ten years of service, and £2 for each additional year of service.

"(*b*) For women: £20 for the first ten years, and £1, 10s. for each additional year of service.

"(*c*) That on approaching the age of sixty-five, the terms on which Disablement Allowances are granted shall, in the interests of the public service, be relaxed"

I AM aware, of course, that the above proposals do not square with the wishes of the party organised and led (I believe) by Mr. Winfield, who is desirous of seeing an optional age for retirement of (*a*) fifty-five for women and (*b*) sixty for men, introduced by an amending Act. There are two great objections to this proposal: First, teachers in the main are opposed to it, and as a matter of fact the great majority of those who reach the age of *sixty-five* are anxious to have their period of service extended; secondly, the deferred annuities payable at either fifty-five or sixty would be so small in amount as to be virtually no provision at all for old age. Mr. Jackman's suggestion to relax the terms on which Disablement Allowances are granted when the teacher approaches the age of sixty-five—"in the interests of the public service"—is, in my opinion, much more practicable and sensible

Local Schemes.

A section of the teaching profession is somewhat enamoured of the idea that the national scheme ought to be materially assisted by substantial subventions from local Educational Authorities. They ignore, however, the very material circumstance that in many districts the rate for educational purposes is rapidly approaching the breaking strain, and whatever augmentation is possible can be much better applied in increasing salaries and providing more highly qualified teaching staffs. Further, any local pension schemes would have the inevitable effect of tying teachers down to service under a particular Authority, a plan fraught with as much danger to the educational welfare of the district as to the ultimate conditions of service of the teachers themselves. The *coup de grâce* to the agitation for local schemes must, I imagine, have been given by the Board of Education in a reply to the Newcastle-on-Tyne Town Clerk's inquiry whether teachers are eligible to benefit from the Corporation Act. The all-important paragraph in Mr. H. W. Simpkin's letter from Whitehall admits of no two interpretations:—

"In so far as the allowance represents a grant at the cost of local funds, *my Lords will make a corresponding deduction from the full amount of superannuation or disablement allowance which would otherwise have been granted to him under the Act of* 1898."

The able and energetic officers of the Head Teachers' Federation would do wisely in joining forces with the Union in its efforts to promote the welfare of *all* classes of teachers. The Head Teachers' Federation's settled policy of "pensions according to salaries" is absolutely impossible during the present decade.

* * *

From Abroad.

DEPUTATIONS from the N.U.T. to professional organisations abroad, besides conveying fraternal felicitations and expressions of goodwill, and in their little way helping to promote universal peace, frequently bring back odds and ends of educational intelligence likely to prove useful in this country. Thus, Miss Selvage, who has just been to the Swedish Teachers' Conference with the President of the Union, supplies the Executive on her return with a few notes on Swedish schools, from which I extract the following:—

1. "In the first and second standards the average number of children for each teacher is about thirty; in the third and fourth standards the average number for each teacher is about forty; while in the fifth and sixth standards the average number of children for each teacher is again dropped to twenty-five or thirty, because the Swedes believe that it is the youngest and oldest children who require the most individual attention."

2. "Attendance is compulsory, but there are no attendance officers. None are needed, for attendance is so regular. They have registers, but only absentees are marked."

3. "Rural mistresses are paid the same salary as rural masters."

4. "During the summer holidays (twelve weeks) in Sweden all school children are allowed to travel at a quarter of the usual railway fare."

Mr. John's description of the Conference proper is interesting, almost amusing, to the British Conference *habitué*. "The addresses were delivered amid the gravest solemnity. No cheers and no demonstration of any kind. After every speech the Conference sang some national music, and in absolute unison. With the exception of Mr. Dalin there was no vigour and no gesticulation in the speakers, which gave one the feeling that one and all were solemnly in earnest over the questions under consideration." What a contrast to the proceedings (say) at Llandudno!

A. C.

NOTES FROM THE NORTH.

The September Meetings.

AS anticipated, the fifty-ninth annual general meeting of the Institute, held on September 16th, was one of the largest ever held in the Royal High School. The large increase in the membership during recent years was partly accountable for this, but no doubt it was even more due to the fact that the Scottish Royal Volunteer Review was to be held in Edinburgh on Monday, the 18th, on account of which the great majority of Town Councils had granted a general holiday. The weather was all that could be desired, with the result that not only was the meeting crowded to overflowing, but the valuable and interesting adjunct to this meeting, namely, the exhibition of school books and apparatus, was exceedingly well patronised. I have on more than one occasion referred to the necessity of a larger building for this important gathering, and it would seem as if in the near future there was likely to be something done in this direction. Of course there are two great, though not insuperable difficulties in the way; in the first place, the proper housing of the exhibits, for which and for nothing else, it may frankly be admitted, many teachers come; and, in the second place, the fact that if the building in which the meeting was held were in a street, the Institute would have to engage the whole street as well. The quadrangle of the Royal High School possesses excellent facilities for the annual parade of teachers, facilities which it would be difficult to obtain almost anywhere else in Edinburgh. The only place that might be available is the University buildings. Many are of opinion that the connection between the University and the Institute should be strengthened, and that the University authorities would hail with satisfaction the annual meeting of the Institute within its precincts. It seems to me that the Edinburgh University is *the* place for the meeting. The annual meeting could easily be accommodated with a larger hall, and what is far more important, perhaps, the exhibits would not be so cramped for room, and spectators would possibly be able to see the exhibits, which at the present time a great number cannot do. But it may safely be said that the matter will be considered by the General Committee of the Institute during the coming session.

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The Burgh and Parochial Schoolmasters.

ON the Friday preceding a series of meetings are usually held in connection with sister associations. The Burgh and Parochial Schoolmasters' Association takes precedence in point of time and age. Thirty-three years have elapsed since the last appointment to the office of parochial schoolmaster was made, and as a result the veterans of the education army in Scotland are each year becoming fewer. Their numbers may not be added to, no recruit may join their ranks. During the year just ended, "relentless Time's inevitable sway" has not failed to leave its impress upon their diminishing ranks. The treasurer, in submitting his report, intimated that the following retiring allowances had been granted during the year:—One at £336, 13s. 4d. for the first year, and £266, 13s. 4d. thereafter; one at £200, one at £170, one at £140, one at £135, one at £120, one at

£113, 6s. 8d, one at £106, one at £105, one at £100, two at £80, one at £76, 13s. 4d., one at £75, and two at £70. This works out at an average of £123, 12s. 1d. How gladly would existing teachers welcome such a pension! Here is a basis for Scotland's demands at the forthcoming septennial revision.

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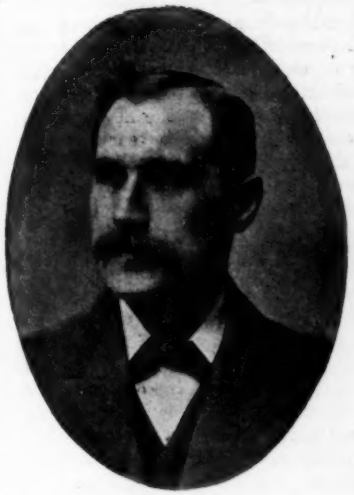
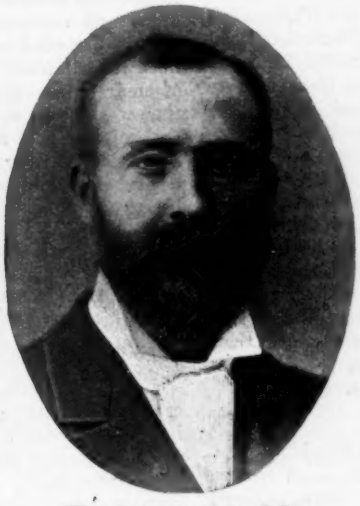
Tenure of Office.

THE President (Mr. A. M'Glashan, Edinburgh) gave his retiring address, in the course of which he referred to the withdrawal of the Education Bill, involving a postponement of the much-needed improvement in their position with reference to retiring allowances and tenure of office. With regard to the latter question, Mr. M'Glashan said that it need not be doubted that the enlargement of areas would imply a substantial improvement in the condition of the teacher's work and surroundings, but speaking for himself, he was free to confess to a certain feeling of disappointment when he saw what appeared to be an exaggerated estimate of the real value and amount of the improvement so generally held by the section of the teaching body most deeply concerned. It was still the fact that the average parish schoolmaster of the past, even of the far past, was neither dissipated, illiterate, indolent, nor unskilful in his work. The tendency of the modern arrangement as to tenure had always appeared to him to be in the direction of crushing out anything like sentiment in the relations of the teacher to his work and pupils, his neighbours, or his Board. He did not feel that he was a trusted man. He could not hide from himself that he was expected to run his school on strictly business lines. Much of the work which made the old parish school the boast of Scotland was the result of sentiment, but that sentiment had its root in the conviction borne in on the conscientious teacher, that his fixity of tenure implied his being a trusted man put upon his honour to do his best for even the poorest boy in his parish. "Tenure during efficiency" was the key to the true position and influence of the teacher in the country, and he for one was firmly convinced that such a tenure must and would ultimately be restored.



JAS. YOUNG, M.A.,
Ex-President.



WM. SERVICE, M.A., B.SC.,
President.

S. M. MURRAY,
Treasurer and Organising Secretary.

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Schoolmasters' Widows Fund.

THE next meeting consisted for the most part of the same members, who, it may be said, filed out of one door and entered by another, to take part in the proceedings of the Schoolmasters' Widows Fund. The President (Ex-Provost Moore, Lauder) in demitting office referred to the growing indifference on the part of the parents of the children of elementary schools towards education. The past year had been one of disappointment to most of the friends of education in Scotland. No one claimed that the Education Bill was perfect, but it was an honest endeavour to grapple with a complex problem, so as to make their educational system harmonious and as complete as possible. There was no doubt that, as a rule, the large School Boards had done splendid work, but many of the smaller parishes did not contain men properly qualified to sit on School Boards. It was now felt generally that School Boards must pass. The public had ceased to take any interest in them, and if interest in education was to be aroused and kept alive it would be by electing managers who cared for and knew something about education. It was to be hoped that the Bill would soon be re-introduced. For some time there had been a growing desire that the Training Colleges should be amalgamated, and that the State, not the Churches, should be the controlling power. There was no doubt that the soul of education lay not in Boards nor in apparatus but in the teachers. Train their teachers well, pay them properly, give them security and thereby attract the best men into the profession, and all would be well. Dr. A. C. Cameron, the treasurer, submitted the financial statement, which showed the balance due to the fund to be £221, 10s. 6d. The total fund amounted to £92,460, 18s. 9d. Reference was made to the losses sustained by death and renunciation. During the year there had been no fewer than twenty-four, among whom was the stalwart

Mr. Doak of Neilston, probably the "tallest teacher" in Scotland. These left a sad blank in the ranks of the now diminishing "Old Guard."

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Meeting of Fellows.

THE annual meeting is usually preceded by the stated meeting of "fellows," who sit as final judges on the recommendations for the degree of F.E.I.S. made by the Board of Examiners. This year the number recommended by the local associations was forty-nine, while nine hail from *furth* of Scotland. The latter were as follows:—Messrs. John Barnet, British School, Old Sheldon, co. Durham; Charles Francis Hayward, Somerville Road School, Birmingham; Wm. Thos. Coles Hodges, A.E.I.S., Art School, Wood Inst., Rugby; Henry Claude Osborne, A.E.I.S., Military Hill School, Dover; John Peacock, Boys' National School, Tweedmouth, Berwick; Edwin Ralphs, A.C.P., Queen's College, Hong Kong; George Sharples, Waterloo Road C. School, Manchester; Charles Taylor, 32 Langdon Park Road, Highgate, London, N.; and George Herbert Watson, Alderman Davies' School, Neath, S. Wales. The following from England and Wales were recommended for the degree of A.E.I.S.:—Messrs. Archibald T. Flux, Highfield C. School, Southampton; William H. Rees, New Tredegar, *via* Cardiff; and John Martin Wale, Whissendine School, Oakham. The applications for the degree of F.E.I.S. were, I understand, very numerous, but the Board of Examiners, in accordance with the desires of the great majority of the Institute, have been most careful in their selection, so that there will soon be little ground for the contention, so freely expressed, that the Institute in the past has been too lavish in its bestowal of degrees.

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President's Address.

PUNCTUALLY at eleven o'clock the President (Mr. James Young, M.A., Biggar), accompanied by the Vice-President, officials, and former presidents, entered the "well." With the standing orders and minutes of last annual meeting approved of, the audience were ready to listen to the address of the retiring President. After referring to the losses sustained by the Institute during the past year, and to the domestic affairs of the Institute as they have been discussed by the various Committees, Mr. Young dealt with the minute establishing Provincial Committees to organise a system of training for teachers. Reform in this direction, he said, had for long been persistently urged by our Institute, but a better system for the training of teachers was never so necessary as at the present time. The time is past when the value of the teacher's work was measured by results (of a kind). Now the attention of His Majesty's Inspectors is directed towards investigating the methods of the teacher, and appraising the value of the process. Scarcely have the fetters been broken which bound the schools under the old Codes than the new freedom is apparent. On every hand old methods are criticised and questioned. New methods of teaching our own language from its earliest stages in the infant class-room are under review. The power to speak as well as to read and write a modern foreign language is to be developed. Even the ancient classics are to some extent subjected to modern influences, as the more recent text-books show. The facts of Science are being learned not from books but by the pupil's own observation and experiment in the laboratory, and the development of a scientific habit of mind is of more importance than an accumulated store of facts. The subject of geometry is attacked not from the theoretical but from the practical side. The graph is threading its way into every subject of the curriculum. Alertness of mind and the power to solve a problem in arithmetic are taking the place of mechanical accuracy in the manipulation of figures according to certain rules. Our pupils draw common objects, leaves, flowers, and fruit, &c., instead of reproducing flat copies of the same. Manual work is not now confined to the kindergarten of the infant department. Everything is in a state of change. Many, if not most, of the changes are excellent, and have been advocated by the most thoughtful and progressive members of the profession. But the important point is that since methods of teaching are deemed of paramount importance, and since old methods are being to such an extent discarded and remodelled, there is a pressing need for the training of teachers in the technical side of their work. He wished all success to the committees that were being appointed to organise the new system, and rejoiced that representatives of the teaching profession, even though the proportion be smaller than is desirable, would bear a share, and he hoped not the least valuable share, in this work.

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The Education Bill.

HE then referred at some length to the Education Bill. He thought that though educational progress may be noted in many directions, we were no nearer the establishment of a National System of Education. The Education Bill, which was to have introduced a new era in the history of Scottish Education, had ended in ignominious failure. On its re-introduction, the Bill again had a remarkably favourable reception from both sides of the House. On every hand, from individuals and public bodies interested in, and conversant with, our present system, or lack of system, came a chorus of approval. All measures of reform meet with opposition, but not for many years have the main principles of any Bill, introducing far-reaching changes, been hailed with so much satisfaction. The people of this country will be slow to accept the statement of the most vigorous opponent of the Bill that various Educational Authorities [he does not care to mention by name Universities, School Boards, Higher Education Committees, and County Councils], the teaching profession, voluntary school managers, the School Board of Glasgow, and the Scotch Education Department, had discussed and approved of the Bill "from the point of view of their own personal interests." Such suspicions are unworthy, and such arguments are worthless, for they can with equal cogency be applied to the parish School Boards for whom he is fighting, but who, in a great many instances, indicated their approval of the Bill.

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Unity not Combination.

IN conclusion, he said the supporters of the Bill contended that public interest in education would be stimulated and increased by the wider educational authority; the opponents of the Bill held that the small School Board, in close and personal touch with the schools, was best calculated to maintain this interest. But has the small School Board maintained public interest in

education? Those who are in a position to know best declare that education is not prized as it was wont to be by the people of Scotland. Those who advocate the retention of the parish area, while they agree in this opinion, lay the blame on an ignorant and bureaucratic Education Department. Many reasons might be adduced to account for the waning interest in education. He mentioned two. In the first place, since the raising of the standard of University entrance examinations, the majority of the schools of this country have slowly but surely lost the power to raise their abler pupils of lowly rank to a higher station in life. With the standard of the entrance examination so high, with well-equipped secondary schools so few and far distant, in the absence of any regulated system of bursaries, and with the resources of the majority of our parishes so meagre, what other result could have been expected? This is the price that has been paid because the parish must retain "a unity and characteristic of its own." Our parochial system of education has served its day and generation. We are of a new day and generation, and are clinging to it after we have outgrown it. Parish and burgh School Boards have accomplished a great work, but the small area is the obstacle to the further provision for higher education, and to the formation of a coherent system. The second reason for the slackening of public interest in education is the weakness of the small School Board. The public know very well that the "powers that be" are the Education Department. Their Boards constantly tell them so. In the real work of education, in moulding the curricula of our schools, School Boards have the veriest minimum of "say and control." In the development of higher education, small School Boards are powerless. The power of the Department has grown to such extraordinary dimensions in order to compensate for the helplessness of the small School Board. The combination, for purposes of higher education, of one or two adjoining areas will not solve the problem. Small School Boards have been urged, without avail, to combine. The small School Board, as a rule, is a weak body, lacking initiative. The combination of several weak bodies will not make a strong one. Combination for purposes of Higher Education will be followed by the conflict of varying and apparently diverse local interests. It is unity, not combination, that is required. Popular interest in education will be revived when popular control is a fact and not a name, and when School Boards are, to a greater extent, free from the shackles of external authority. But only in a School Board administering education over a much larger area resides the breadth of view, the initiative, and the power, which can entitle it to be free.

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AT the conclusion of the President's eloquent and powerful address, the following motion was put to the meeting from the chair, and carried unanimously:—

"That the Annual General Meeting of the Educational Institute of Scotland deplores the failure to pass into law the Education (Scotland) Bills of 1904 and 1905, and in view of the urgent necessity for putting an end to the present confusion and for preventing further injury to education, respectfully urges His Majesty's Government to re-introduce the Bill, and to give it the foremost place in the legislative programme of next session."

Mr. William Service, M.A., B.Sc., High School, Coatbridge, was, as the highest candidate in the election, proposed as president for the ensuing year. With the election of Miss Isobel Hamilton, Pupil Teachers' Institute, to the Vice-Presidentship, and votes of thanks to the Ex-President and Ex-Vice-President, the purely formal business was nearly finished. Mr. J. Laurence was re-elected Secretary.

Election of Officials.

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THE Treasurer, Mr. S. M. Murray, then submitted the annual financial statement. The finances are in a healthy position, and Mr. Murray had little trouble with the meeting. During the year the income was £1560, 11s. 0d. for the General Fund, and £409, 3s. 10d. for the Benevolent Fund; the expenditure was £1171, 0s. 6d. and £267, 10s. 0d. for these funds respectively, leaving a total increase of £531, 4s. 4d., made up of £389, 10s. 6d. on the General Fund, and £141, 3s. 10d. on the Benevolent Fund. The capital of the Institute now stands at £7178, 6s. 11d. The membership of the Institute has now reached nearly 8000, and as the President pointed out, the increase in membership during the last three years has been over 3000. Mr. Murray did not report on his work as Organising Secretary, except in so far as the great increase in the membership was concerned. The Institute in its latest step has done well, and it may safely be said that the step has been warranted. I should like to see the Institute taking the next step, namely, the securing of an M.P. from among its members. The reference to this subject made by the President in his address was cordially received, and it looks as if the Institute would make this next great but necessary step in the near future. I referred in my notes to this last month, and I trust to see it an accomplished fact ere long. Mr. Murray was re-elected to the office of Treasurer and Organising Secretary, and at the same time the Auditors were re-appointed.

Finance.

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DR. DICKIE, who carries his retiral well, reported on behalf of the Board of Examiners. The fellows I have referred to above were then welcomed by the President, and the new Board of Examiners elected. The Fifeshire branch, on behalf of the Carnegie Trustees, invited the Annual Congress to Dunfermline. If all reports are true, the next Congress will be one of great interest. They mean to make it the most successful of its kind ever held. It has even been suggested that it should meet on three days instead of two as previously. There is much to be said for such an innovation, as the number of papers at previous congresses have always crushed out any discussion from the audience. The fact that Dunfermline is such an excellent centre may give success to this new idea. This brought to an end the forenoon sederunt. Not a ripple disturbed the placid calm of the proceedings. Everything went like clockwork, and the interval as a consequence was somewhat longer.

Board of Examiners.

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THE delegates were somewhat slow in assembling during the afternoon; but ere the minutes of Committee were disposed of there was a very large gathering. It seemed as if there was to be no discussion on the minutes. For a brief space we were congratulating ourselves on the fact, that for the first time in the

Afternoon Sederunt.

history of the Annual General Meeting the General Committee had committed no mistakes, and their services were to be appreciated by entire acquiescence in what they had done during the year. But after a lull an opening was made. It was remitted to the officials of the Institute to look out for a larger place of meeting. I have referred to this in the opening paragraph. It is not a day too soon. Many of the younger members are feeling very keenly the question of the Superannuation Act, and it was not surprising that Mr. A. Small, Glasgow, should refer to the little that had been done by the Parliamentary Committee with reference to the subject. The Parliamentary Committee, through Mr. S. M. Murray and Mr. M'Whan, Cambuslang, convener, defended their action during the past year. They had concentrated their attention on the Bill and that clause of the Bill which gave to School Boards the power to supplement pensions. After some wordy warfare it was agreed that the Committee should this year give it their most earnest consideration.

IN a somewhat lengthened speech Mr. Cheyne of Alves proposed the following overture from Inverness, Banff, Moray, and Deer Branches: "Whereas the year 1905 is being observed as the quater-centenary of the birth of John Knox, the Branch humbly overtures the Educational Institute of Scotland, in annual general meeting assembled, to record an expression of its appreciation of the work of John Knox as an educational reformer." The audience listened with evident impatience to his speech, after they had with unanimous voice cried "Agreed" immediately on hearing the terms of the overture. Much discussion then took place over an overture from Perthshire with regard to rural schools. At length, and after almost an hour's playing with words, the following was, on the motion of Mr. Fenton, Aberdeen, adopted: "That the Educational Institute condemns any attempt to confine rural schools to the work of strictly elementary education as contained in supplementary courses, and urges upon educational authorities the advisability of maintaining, as far as possible, one school in every parish in which the foundation of a secondary or higher education may be laid." This was all the business, and a vote of thanks to the President closed one of the quietest and most harmonious meetings. The Institute has shown by its grasp of educational questions that it means business. There are one or two questions that require solution in the near future. Specially might I refer to the subject of rural schools. Many of the teachers in these schools are doing excellent work, but neither as regards tenure nor remuneration are they at all satisfied. In all probability more will be heard of their side of the question during the coming year. It is felt that the class teachers, by their organisation, have done much to inform and enlighten public opinion with regard to their conditions of service. Something will have to be done on similar lines for rural teachers.

Rural Schools.

FOR the last two or three years the lady members of the Institute have held a meeting at the close of the Annual Meeting. The purpose of the meeting is to arouse the interest of ladies in the work of the Institute. This object has to a large extent been achieved, and as a result the meeting this year was very well attended. The following subjects were discussed: "Arithmetic in Infant and Junior Schools," and "The Education of Girls." Miss Hamilton, as Convener of the Ladies' Committee of the Institute, gave an account of the work done by that Committee during the past year. The work has been very successfully accomplished, and has included such questions as "The Feeding and Clothing of Children" and the establishment of a handbook for use of the members of the Institute. Next year will see the Diamond Jubilee of the Annual Meeting, and no doubt efforts will be made to make the meeting more successful than any yet held.

Ladies' Meeting.

REGULATIONS FOR SECONDARY SCHOOLS.

GEOGRAPHY.

IN the above Regulations the Board of Education require in each school a Course of General Instruction, including Geography, and extending over four years. In order to facilitate the adoption by Secondary Schools of systematic Courses in Geography, the Board think it desirable to indicate in outline the points to which the attention of their Inspectors will be directed, as regards:—

1. Granting approval of the Course, and

2. Taking the Course into consideration in estimating the efficiency of the school.

Each school desiring the approval of the Board for its Course in Geography should be prepared to submit a Course providing:—

1. An outline scheme dealing with the great land and water areas in such a way that on completing the Course the scholars shall have gone through a Geography of the World.

2. A suitably graduated series of exercises connected with the subject-matter of the Course.

Inspectors will be asked to report:—

1. As to the stages of instruction attained by the pupils on their entry upon the Course.

The application of a test in the subject of Geography on admission to the Course is desirable, and records of the results of such tests should be kept.

Before admission to the Course scholars ought to possess a general elementary knowledge of the great land masses of the world, the disposition of highlands and lowlands, the chief river valleys, and the names and positions of great countries and of a few of the chief towns in each. In addition a more detailed knowledge of the geography of the British Isles should have been attained. Throughout the preliminary Course great emphasis should have been laid on the inter-relation of cause and effect.

Scholars should possess also some knowledge of elementary Physiography, including the Earth's shape, simple map-making, the compass; day, night, and the seasons; formation of mountains and rivers; the oceans; climate; minerals; plant and animal life.

2. As to the number of hours or periods available per week for the subject.

The time allotted to Geography should in general be not less than 2 periods of school work and 1 of home work. One of the

school periods should be largely devoted to dealing orally with exercises and home work.

3. As to the method employed by the teacher.

(*a*) The aim of the teaching should be to produce a vivid impression of connected facts through considerations such as those of cause and effect and practical bearings of the facts selected.

The Board desire to leave freedom and wide scope to schools with regard both to subject-matter and methods of teaching, which should be carefully adapted to the special conditions existing in each case.

(*b*) It is desirable that the teacher should frame for each term a plan for the teaching of the selected portions of the subject, including the sections of the text-book (if any) used to supplement the oral instruction.

The scale of treatment and the amount of detail for each term's work will necessarily depend upon the time available.

(*c*) Each scholar should possess an atlas, but text-books are not essential in cases where the teacher has special knowledge. Where the teacher has not such knowledge, text-books should be used, and should be chosen with special regard to succinctness, clearness, and accuracy. Teachers should accustom themselves to bring the information given on commercial and political geography up to date. Statistics, as such, should be avoided, but if they are used in the later years of the Course they should be verified in round numbers by the teacher.

Wall maps, which should be large, clear, and up to date, should be in constant use by the teacher; and the scholars should be trained to follow the teaching, each by means of his own atlas. Atlases should be simple, *i.e.* not overcrowded with names nor over burdened with detail of any kind; relative land levels and sea depths should be indicated by colour graduations. For teaching of physical and commercial geography separate maps, if possible, should be used.

Globes of a suitable size for class demonstrations, diagrams, relief-models, specimen products, photographs, and a collection of county and detailed maps for references are recommended.

4. As to exercises. The following exercises may be suggested in connection with the subject-matter of the course:—

(a) *Questions and answers* (graded in difficulty from year to year) designed to elicit, through causes and consequences, subject-matter for entry in the scholars' note-books.

No facts should be stated without reasons; and the reasons are best expressed by the class itself.

(b) *Notes and diagrams.* Scholars' notes should not contain merely reproductions of lessons but also worked-out problems together with original maps and plans.

(c) *Mapping.* Maps and diagrams should be regularly set, and in each case with a definite object, *i.e.* to illustrate a lesson from a particular point of view—physical, political, commercial, &c., no extraneous names or signs being inserted. Scholars should be required to justify each name, &c., inserted.

(d) Field-work, excursions, factory-visits, and the like may occasionally be used with good effect.

N.B.—The Board desire it to be understood that the appended Scheme is given merely as illustrating one of many ways of dealing with the subject-matter of the Course in question.

Next month we propose to give the first of a series of papers dealing with this subject.

THE STATUTE LAW AFFECTING ENGLISH SECONDARY SCHOOLS.

BY T. A. ORGAN, B.A., BARRISTER-AT-LAW, OF THE INNER TEMPLE AND THE OXFORD CIRCUIT.

THE Tripartite Division in Educational Administration.—The administrative work of the Board of Education is divided into three parts. The first is concerned with Elementary Schools, the second with Secondary Schools, and the third with Evening Schools and Classes, Science and Art Classes, Technical Institutions, Museums and Colleges. In this and the following articles it is proposed to deal only with those institutions which fall into the second part. We recognise that the division is arbitrary, and that from an educational point of view a portion of the work done in Science and Art Classes, in Evening Schools and in Technical Institutes, is of a secondary character. But our purpose is that of stating the statutory duties and powers of education authorities in the matter of Secondary Schools, confining that term to those institutions which are so recognised and named by the Board of Education.

A "Secondary School" defined.—The official definition of a Secondary School is "a Day or Boarding School, which offers to each of its scholars up to and beyond the age of sixteen a general education, physical, mental, and moral, given through a complete graded course of instruction, of wider scope and more advanced degree than that given in Elementary Schools." Schools which satisfy this definition have existed for many years in England, but they are few in number and nearly all of a private or quasi-private character. Until recently our national system of education took no heed of these schools, nor of the crying need for powers to provide them in greater numbers and to aid those already in existence. Now, however, this is altered, and the Board of Education are seriously setting about the work of organising these schools, which form at the present time "the least organised part of the national system of education."

The Central Authority—its Duties and Powers.—The central authority having the superintendence of these schools is the Board of Education. Upon this Board Parliament imposes the duty of administering and distributing a sum which is annually provided out of Imperial funds for the purposes of Secondary Schools. The regulations under which these funds are distributed are annually revised, and at the present time provide for capitation grants (varying from £2 to £5), paid on account of those scholars in a Secondary School who fulfil certain conditions laid down in the regulations. All schools receiving these grants must be open at all times to inspection by the Inspectors of the Board. If the governing body of a Secondary School which is not grant-aided desire inspection, the Board is authorised by Section 3 of the Board of Education Act, 1899, to conduct an inspection, under conditions which will be dealt with in a later article.

A fundamental difference between the powers of the Board relating to Elementary Education and those relating to Secondary Education should be noted here. In the case of Elementary Education it is the duty of the Board to see that the local education authorities provide and keep efficient elementary schools sufficient in number and size to satisfy the needs of the population. If any local education authority fail in its duty in this

respect the Board's powers must be exercised, and the neglectful or recalcitrant authority compelled to do its duty. In the case of Secondary Education no such compulsory powers exist. The local education authorities *may* provide or *may* aid in providing secondary schools; but if any local education authority decide that it is inadvisable either to supply or aid such schools, that decision is final, for the statute leaves the local bodies with unfettered discretion as to this matter.

Local Education Authorities.—The Education Act, 1902, empowers all local education authorities, and some local bodies which are not education authorities, to provide and maintain Secondary Schools. The power is further extended by giving permission to these authorities and bodies to financially aid the governing bodies of Secondary Schools which are not provided by public funds. These powers are very wide. The Act orders the local education authority to consider the needs of their area, so far as Secondary Schools are concerned, and to take such steps as may seem to them desirable to supply such needs or aid in supplying them. Before acting, the local authority must consult the Board of Education, but the Board has no power of vetoing the decision of the authority. It would appear that the Board's function is advisory only. There are, however, statutory limitations of the powers of the local education authority respecting religious instruction and existing schools, to which reference is made in a subsequent paragraph.

The following bodies are local education authorities: (1) County Councils, (2) County Borough Councils, (3) the Councils of Non-County Boroughs with a population over 10,000, (4) the Councils of Urban Districts with a population over 20,000. The Councils of Non-County Boroughs with a population of 10,000 and under, and those of Urban Districts with a population of 20,000 and under, are not local education authorities, but for the purposes of Secondary Schools they have powers similar to those conferred on education authorities.

Expenditure on Secondary Schools.—The funds for the provision and upkeep of Secondary Schools may be drawn from any, or all, of the following sources. (1) From the residue paid by the Local Government Board to County Councils and County Borough Councils under the provisions of the Local Taxation (Customs and Excise) Act, 1890. (2) From the rate fund of the authorities. The amount which can be drawn from the rate fund is limited in the case of County Councils to such a sum as would be produced by a rate of 2d. in the £, and in the case of Councils of Non-County Boroughs and Urban Districts to such a sum as would be produced by a rate of 1d. in the £. There is no limitation on the amount where the authority is the Council of a County Borough. (3) From grants made by Parliament and distributed by the Board of Education under the regulations for Secondary Schools. (4) From trust funds, donations, or other private sources. (5) From the school fees. As to fees in those schools receiving grants from the Board of Education, the scale must be approved by that Board. The opinion of the Board respecting fees is thus stated:—

"In ordinary circumstances the Board consider that a fee of substantial amount is desirable, both in order to ensure the financial stability of the school and also to emphasise the fact that the education provided is of a superior kind, and consequently of a greater value to the scholars, than that in schools which, although they go beyond the ordinary elementary curriculum, do not aim at the higher standard and fuller course of an efficient Secondary School. Good education cannot be bought cheap; it must be paid for, whether by the scholars or by some one else for them. It would be most unfortunate if the opening of the educational ladder to children of every class were to be accompanied by any lowering of the standard of education provided. But this must inevitably be the case if funds are not avilable to secure the full material equipment of the school, and the provision of a teaching staff adequate both in numbers and qualification. Again, it would be equally undesirable that the limited funds available for the support of Secondary Schools should be wasted on scholars who, either because they enter the school insufficiently prepared, or because they leave it prematurely, do not in fact profit by the course of education which it is organised to provide. This danger is greater in the case of schools with a low fee, or with none, and special precautions have therefore to be taken to guard against it. It is the duty of the Board, in view of these considerations, to see on the one hand that the school is not starved, and is in a position of full financial stability; and on the other hand that there is adequate security against the admission of scholars who are not fit to profit by the course, or their failure to continue in it up to a sufficiently advanced point."

Religious Instruction in Secondary Schools.—In the case of a school provided and maintained by a Council, it is enacted that no pupil shall be excluded from such school on the ground of religious belief, nor shall he be placed in any inferior position. No catechism or formulary distinctive of any particular religious denomination can be taught in the school under ordinary circumstances. But the Council may allow distinctive religious instruction to be given, under such conditions as they may think desirable and at the request of the parents of scholars, provided (1) that no cost is incurred by the Council as the result of giving such instruction, and (2) that no unfair preference is shown to any religious denomination.

No Council may make it a condition of aiding a Secondary School that any particular form of religious instruction or worship, or any religious catechism or formulary, shall or shall not be taught in the aided school.

In every Secondary School, which is either aided or fully maintained by a Council, every scholar must be entirely free to attend or abstain from attending any Sunday school, place of religious worship, religious observance, or instruction in religious subjects in the school or elsewhere. The times for religious worship or for any religious instruction must be so arranged as to conveniently allow the withdrawal of any scholar therefrom.

"Regard" to Existing Schools.—We have already pointed out that Councils have very wide powers in the matter of supplying and aiding the supply of Secondary Schools; but there is one distinct limitation in the Act of 1902, which reads:—

"A Council in exercising their powers under this part of this Act shall have regard to any existing supply of efficient schools or colleges, and to any steps already taken for the purpose of higher education under the Technical Instruction Acts, 1889 and 1891."

REPORT ON EDUCATION IN SCOTLAND.

THE Blue-Book containing the report of the Committee of the Privy Council on Education in Scotland, just issued, is a most exhaustive document. It extends to 1148 pages. Each year sees the report more complete, and as a consequence more valuable; but we question the wisdom of sending out in advance to the daily papers a great deal of what is contained

in the Blue-Book, with the result that one of the leading dailies, considering the two different, has during the last three months had three columns filled with exactly the same matter. Then some of the matter relates to 1904 and some to 1905. To take one example, the report of the Leaving Certificate Examination is for June 1904, whereas the results for this year are already out. There is, in fact, too much matter in the report that is *réchauffé*. But as this report forms the transition from the old to the new, and is partly the work of Dr. Craik and partly of Dr. Struthers, we shall not be too critical.

In addition to the usual information, the Blue-Book contains the selection of Circular Letters of the Scotch Education Department, 1898–1904, with explanatory memorandum, and the Report on the Gemeindeschulen (Elementary Board Schools) of Berlin and Charlottenburg, by Mr. George Andrew, H.M.I. But as we have already referred in these columns to these two documents at the time of issue, it is unnecessary here to deal with them again.

Ages and Attendance.

The report states that during the year ended 31st August 1904, the estimated increase of population was 1·1 per cent., while the number of scholars on the registers of schools under inspection increased by 1·02 per cent., with an increase of 1·94 per cent. in the average attendance. Of the 793,492 scholars on the registers, 757,874 were children of school age (5–14), 14,099 were under 5 years of age, 142,760 were between 5 and 7 years of age, 278,345 were between 7 and 10, 336,769 were between 10 and 14, 14,086 were between 14 and 15, and 7433 were over 15. Of these scholars, 682,269 were on an average in daily attendance throughout the year.

Cost of Education.

The amount of Parliamentary grants to day schools under inspection has increased from £766,541, 18s. 9d. to £810,361, 4s. 5d.; while the rate of grant for each scholar in average attendance has increased from £1, 2s. 11¼d. to £1, 3s. 10¼d. The "cost of maintenance" per child in average attendance was, in public schools, £3, 0s. 2¼d, and in voluntary schools, £2, 8s. 3¾d. Towards which there was contributed:—

	In Public Schools.			In Voluntary Schools.		
	£	s.	d.	£	s.	d.
By Ratepayers	0	19	11¾		—	
„ Subscribers		—		0	8	7½
„ Aid Grant to Voluntary Schools		—		0	3	0
„ General Aid Grant	0	1	7½	0	0	11
„ Fee Grant	0	12	0	0	11	7
„ Fees—Children's pence, &c.	0	0	11¼	0	1	7¾
„ Endowment	0	0	4¼	0	0	9
„ Miscellaneous receipts	0	0	6	0	0	6½
„ Secondary Education Committees	0	0	9½	0	0	2½
Total	1	16	2½	1	17	3

Physical Training.

In discussing the subjects of instruction, the report points out that the subjects in which the lack of expert teachers is most felt are physical exercises and drawing, but this defect is being gradually remedied through the agency of the classes for the further instruction of teachers which have been established under Article 91 (*d*) of the Code. After allowing sufficient time for the operation of these classes to have its due effect, no school will be recognised as efficient whose staff is not specially qualified in respect of some one or other of its members to give efficient instruction in all the branches of the normal curriculum.

A Royal Commission was appointed in 1902 to inquire into the opportunities for physical training now available in the State-aided day schools and other educational institutions of Scotland, and to suggest means by which such training might be made to conduce to the welfare of the pupils, and, further, how such opportunities might be increased by continuation classes and otherwise, so as to develop, in their practical application to the requirements of life, the faculties of those who have left the day schools, and thus to contribute towards the sources of national strength. That Commission made its report in March 1903.

As was suggested by the Commission, a committee was appointed to draft a suitable course of physical exercises for schools, and the report of this committee, together with the syllabus of physical exercises prepared by them, was issued in March 1904. School authorities have been furnished with a copy of this syllabus, and their special attention has been drawn to the terms of the report.

Higher Grade Schools and Departments.

The number of Higher Grade departments has increased from 74 in operation during the session 1903–4 to 116 at the beginning of the present session. Under the conditions created by the Act of 1901, these departments are no longer required to discharge the function of giving something of the nature of specialised education to pupils who will leave school at a comparatively early age. That function, so far as it is necessary, is now discharged by the supplementary courses. The Higher Grade departments are therefore free to continue a stage further the *general* education of that considerable body of pupils, who, under the new conditions, may be expected to remain at school till 15 or 16. Hence the courses — predominantly scientific or predominantly commercial — which formerly characterised these departments will tend to disappear and be replaced by a course of general education in which the study of English, and one or more languages, will be balanced by a sufficient but not excessive discipline in mathematics (including arithmetic), science, and drawing, all specialisation on commercial or technical lines being postponed until the pupils have reached the stage of the Intermediate Certificate.

Pensions.

During the year ended at Michaelmas 1904, 22 applications on behalf of teachers in Scotland have been received, and 1 pension of £30, 5 of £25, 4 of £20, and 1 of £10 have been awarded.

During the year ended 31st March 1905, annual superannuation allowances amounting to £399, 12s. 2d. were granted under sections 1 (2) (*d*) and 5 (2) (*a*) of the Elementary School Teachers (Superannuation) Act, 1898, to 12 teachers (11 men and 1 woman) who

had attained the age of 65 years, or any later age to which their certificates may have extended under section 1 of the Act.

During the same period disablement allowances, amounting to 19 teachers under 65 years of age (8 men and 11 women), who satisfied the Treasury that they had become permanently incapable, owing to infirmity of mind or body, of being efficient teachers in elementary schools.

Continuation Classes.

In discussing the continuation classes, the report shows that the preparatory classes under Division I. for the completion of general elementary education, which are intended to serve a temporary purpose only, show little change numerically, additional proposals from new managers being responsible for the maintenance of the present high number. The department look forward to the time when, as a result of a more thorough previous general education in the day school, pupils will be in a position to profit by the specialised instruction provided under the other divisions of the Code without undergoing any preliminary preparatory training.

The classes established for specialised instruction under Divisions II. and III. have increased in number and importance. Greater interest has been shown in submitting schemes of work more adapted to local needs; there is a tendency towards an improved correlation of work. In some cases an improvement is observable in a more satisfactory organisation of classes within burghs, both as between those under the same management and those under different management. The adoption in all large centres of a co-ordinated system of instruction for continuation class pupils, from the time of leaving the day school, is desirable in the interests alike of the students and of education.

Attendance at the auxiliary or recreative classes under Division IV. shows little change from one session to another. Of such classes, those for physical training appear to be the most popular. But it is disappointing to find a disposition on the part of far too many of the students to overlook the obvious advantages of attending also classes of a strictly educational character.

Supply of Teachers.

The problem of supply, says Mr. A. E. Scougal, H.M. Inspector of Training Colleges, in his report on these institutions, involves more than a mere consideration of the number of places provided for the training of students. It so happens that on the male side there is, and has always been, accommodation for properly qualified candidates. The problem is an economic one. What is wanted is a larger number of aspirants for the profession; and this depends, in the first place, upon the emoluments and other attractions pertinent to the service. It is true that within recent years the salaries of male teachers have been on the increase, and the prospects of those who now enter the profession are greater than formerly. The recent establishment of Higher Grade schools throughout the country has also increased the demand, particularly for more highly qualified masters; and there is good reason for the expectation that as the status of the teacher and the value of his services are becoming more and more appreciated, the greater demand will be met by a corresponding increase in the supply.

In the case of female candidates for admission to a Training College, the number of applicants has for many years been greater than the number of places at disposal. Teaching has long been one of the most attractive vocations for women, and there is accordingly no reason for surprise that there should be an excess in the number of candidates. The main factor to be taken into consideration is the extent to which the demand for trained female teachers exceeds the supply. One benefit of the competition for admission is the higher average quality of the students admitted. But mixed up with this question is that of the employment as assistant teachers of those candidates who do not pass the King's Scholarship Examination sufficiently high to secure admission to a training college. Such teachers are eligible for employment under Article 79 of the Code, though they can be recognised only for a more limited number of pupils than the trained teacher. This class of assistant is, on economical and other grounds, largely employed, particularly in small schools. Again, by further study, such teachers may qualify themselves to pass the Certificate Examinations and gain their Parchment Certificate. The demand for trained teachers is consequently considerably affected by the number employed under the conditions just mentioned. There is no doubt, however, as to the desirability of securing as large a representation as possible of the "trained teacher" element in our schools, and with this object in view the number of female King's Scholars and students accepted for training has within recent years been considerably increased.

Circular 533.

CIRCULAR TO LOCAL EDUCATION AUTHORITIES.

National Home Reading Union.

BOARD OF EDUCATION,
WHITEHALL, LONDON, S.W.
6th September 1905.

SIR,—The Board of Education desire to draw the attention of Local Education Authorities to the aims and methods of the National Home Reading Union. Since its foundation in 1889, one of the principal aims of the Union has been to encourage children in elementary schools to read books for themselves under the guidance of competent scholars. It desires by creating in them the love of systematic reading, and by fostering the habit of reading among those who have left school, to become an effective means, not only of broadening school education, but also of prolonging and confirming its influence. With these objects, which are of national importance, the Board are entirely sympathetic, and they believe that much might be done to further them through the co-operation of the Local Education Authorities with the Union. It is as important to strengthen those influences outside the school which support the teacher's work as to improve that work itself, for under the most favourable conditions less than a third of the pupil's life while under instruction comes into contact with the teacher. If, therefore, the external influences are hostile, the loss of power within the school itself is incalculable. The Board believe that the learning and guidance offered by the National Home Reading Union, if made available systematically for the pupils studying in, or just leaving, the various types of educational institution under the control of Local Education Authorities, would deepen and enhance the value of the instruction now given; and this at a cost trifling when compared with the value of the work which would be done. The stimulus to further study and the other benefits that would accrue to the community from the wider outlook

gained at the most impressionable and hopeful period of life would be in the opinion of the Board not the least noticeable or important results of a general adoption of the Union's programme.

The Board are aware that a number of Education Authorities have already recognised the Society's work and have sanctioned the forming of "reading circles" in connection with it; but they are anxious to take an opportunity of bringing its aims and methods before all the Local Education Authorities throughout the country in the hope that many more may see their way to similar co-operation. The Union is fortunate in being able to call to its aid the advice and help of a number of distinguished men of letters and of science who contribute important and interesting articles to its official journals, and draft the very varied courses of reading which the Union offers to the choice of "reading circles."

The Board recognise with regret that in every area there are schools which even the small expense entailed by the scheme will debar from participating in the advantages that may be expected to come from co-operation with the Union; and that there will also be schools where the children and the teachers may be unequal to the courses of work which the Union proposes. At the same time, though they recognise the limitations of the scheme, the Board are of opinion that an increasing number of Public Elementary Schools are qualified to profit by it, and that with few exceptions it may most advantageously be adapted to the needs of Pupil Teacher Centres, Higher Elementary Schools, Secondary Schools, and some Evening Schools in each area. In such schools the conditions appear to be eminently favourable for its adoption.

The proposed methods of co-operation between the National Home Reading Union and the schools as outlined by the Union are as follows:—

1. Teachers in elementary schools and pupil teacher centres might become members of the Society upon the payment by Local Education Authorities of 1s. 6d. per annum, and thereby receive gratis the selected list of books recommended, the monthly magazine, and be entitled to obtain additional copies of it at a small extra cost for use in the schools.
2. Classes might be formed into "home-reading circles" under the leadership of the teacher.
3. The selected books of the Union might be adopted as class reading-books in the higher standards, and the children allowed to take the books home.
4. Scholars might be encouraged, after leaving school or the pupil teacher centre, to join the National Home Reading Union "reading circles."
5. The books in the National Home Reading Union list might be correlated with the subjects prescribed in Evening Schools in which language and literature or other suitable subjects are included in the course, and "reading circles" be formed in connection with such Schools.

For further information application should be made *direct* to the Secretary, Mr. Vere Collins, B.A., National Home Reading Union, Surrey House, Victoria Embankment, London, W.C., who will, the Board understand, confer with Education Officers, if desired, upon the way in which the work of the Union can be best brought into relation to the needs of their particular areas.

I am, Sir,
Your obedient servant,
ROBERT L. MORANT.

To the
Local Education Authority.

Circular 534.

CIRCULAR TO PUBLIC LIBRARY AUTHORITIES.

National Home Reading Union.

BOARD OF EDUCATION,
WHITEHALL, LONDON, S.W.
6*th September* 1905.

SIR,—The Board of Education desire to draw the attention of Public Library Authorities to the aims and methods of the National Home Reading Union. Since its foundation in 1889, one of the principal aims of the Union has been to encourage children to read books for themselves under the guidance of competent scholars. It desires by creating in them the love of systematic reading, and by helping to remove as far as possible any difficulty in the way of obtaining easily the right kind of books, to become an effective means, not only of broadening school education, but also of prolonging and confirming its influence. With these objects, which are of national importance, the Board are entirely sympathetic, and they believe that much might be done to further them through the co-operation of the Public Library Authorities with the Union. It is as important to strengthen those influences outside the school which support the teacher's work as to improve that work itself, for under the most favourable conditions less than a third of the pupil's life while under instruction comes into contact with the teacher. If, therefore, the external influences are hostile, the loss of power within the school itself is incalculable. The Board believe that the learning and guidance offered by the National Home Reading Union, if made available systematically for the pupils studying in, or just leaving, the various types of educational institution would deepen and enhance the value of the instruction now given; and this at a cost trifling when compared with the value of the work which would be done. The stimulus to further study and the benefits that would accrue to the community from the wider outlook gained at the most impressionable and hopeful period of life would be in the opinion of the Board not the least noticeable or important results of a general adoption of the Union's programme. The Board have already addressed a letter to Local Education Authorities calling attention to the advantages which may be expected to arise from joint action by the schools and the Union. Such co-operation, however, needs the support of the Public Libraries for its best fruition, as in a similar way the University Extension movement depends for a considerable measure of its success upon the Local Libraries which are open to the public. In the Public Libraries the Board recognise a link between the schools and the work of both the National Home Reading Union and the University Extension movement, and they would be glad to see realised the Union's hope that the Public Libraries should become to the fullest possible extent an educational power acting in harmony with other educational organisations.

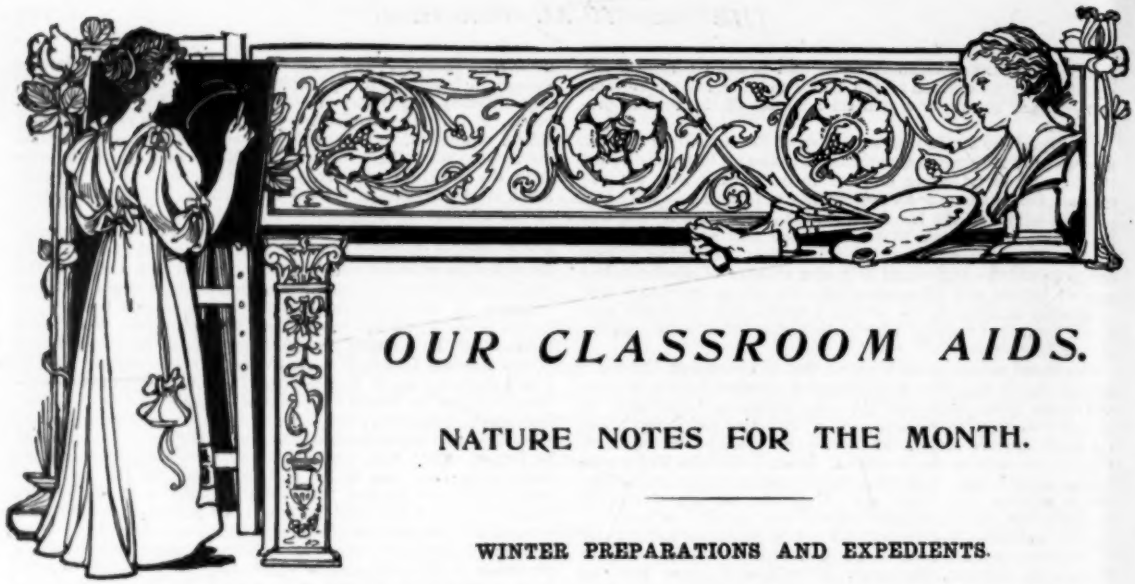
The proposed methods of co-operation between the National Home Reading Union and the Library Authorities as outlined by the Union are as follows:—

1. Librarians might become Honorary Members on the payment of 10s. 6d. per annum, thereby receiving gratis the selected list of books and all the monthly magazines, and being entitled to obtain extra copies of the latter at a small extra cost.
2. The Library might provide books included in the lists. The "required" works (which in most cases will be bought by the reader) are such as most Libraries already possess, but the Libraries might undertake to purchase the more expensive books recommended to "leaders" of circles.
3. The card supplied by the National Home Reading Union should be displayed in the Library, drawing attention to the aims and methods of the Society, and referring to the Librarion for further information.
4. The Librarian might group readers in "reading circles." The Public Library would thus become the centre of the Union's work for the area. The Board have reason to think that there are a number of persons anxious to organise "reading circles" who are prevented from doing so by the difficulty which they experience in collecting a number of readers. By forming lists of young people wishing to join such circles the Libraries would be able to bring together those who wish to organise circles and those who desire to profit by the advantages which a "reading circle" affords.
5. Accommodation for "reading circles" might be offered, where possible, on the Library premises.
6. Articles from the National Home Reading Union magazines might from time to time be included in the Library magazines.

For further information application should be made *direct* to the Secretary, Mr. Vere Collins, B.A., National Home Reading Union, Surrey House, Victoria Embankment, London, W.C., who will, the Board understand, confer with Librarians, if desired, upon the way in which the work of the Union can be best brought into relation with the facilities already offered by their Libraries.

I am, Sir,
Your obedient servant,
ROBERT L. MORANT.

To the Chairman,
Library Committee.



OUR CLASSROOM AIDS.

NATURE NOTES FOR THE MONTH.

WINTER PREPARATIONS AND EXPEDIENTS.

THE changes wrought by advancing winter are quite as interesting, though perhaps not so welcome to the naturalist, as those which signalise the return of spring.

During the summer months all the field folk are able to live a life of comparative ease and enjoyment, thanks to the clemency of prevailing conditions, but with the wane of autumn there arises a totally different state of affairs.

Viewed from our standpoint, it is wonderful how the wild creatures manage to survive unaided through the winter perils, pre-eminent amongst which are fatigue, hunger, and privation due to climatic vagaries; and yet in spite of adverse circumstances, the chain of life remains unbroken at its weakest link, and each succeeding summer sees no diminution in the numbers of our friends.

Obviously they must make preparations. Man himself, the lord of creation, conforms of necessity with the exigencies of winter, and so with the birds. They make preparations (unconsciously, perhaps) just as the prudent householder augments his store of fuel and clothing. It is also needless to say, that during the winter their habits become modified, and even radically altered, to suit the changed circumstances, and many are the expedients to which they are compelled to resort.

Very few of the lower forms of life pass the winter in a state of activity.

With regard to the insects, those which have reached the perfect or mature state, are mercifully blotted out of existence with the first frosts; be it noted, after they have fulfilled their duties by laying the foundation of future broods. There are exceptions—the bee, the ant, and the pregnant female wasp being the most notable survivors, the latter hibernating in solitary splendour.

A few of the late-emerged lepidoptera, the Small Tortoiseshell, for instance, creep into odd corners and follow the example of the queen wasp; but, with the exception of a small moth which flies in December, insect life is conspicuous by its absence.

Those which are overtaken in the larval stage have two alternatives—pupation or hibernation. If full-fed they pupate and remain quiescent in their shelly covering, beneath the ground, or in a sheltered crevice. With the fall of the leaf, immature larvæ, such as the caterpillars of the Magpie, Tiger Moth, &c., obviously unready for pupation, effect a compromise by spinning light cocoons, either between dead leaves, or in a convenient crevice of a tree trunk. And so they sleep until the trees put forth their leaves again.

With insect life at its lowest ebb it is not surprising to find a corresponding disappearance of the reptiles which prey upon insects.

Here, again, hibernation is resorted to.

All reptiles are noticeably plump at the end of summer.

Readers who keep frogs and snakes (presumably not together) will take a hint from nature if they wish their pets to survive the winter, for the accumulation of fatty tissue is destined to be the fuel which maintains the vital spark during the six months of torpidity.

Snakes and lizards sleep soundly in the banks and hedge bottoms amongst the tangled roots, and are occasionally brought to light during digging operations. Frogs and newts, it is said, betake themselves to the mud at the bottom of ponds, though in captivity it will be found that they apparently prefer to slumber in the damp caverns beneath the artificial rockwork. Without exception the reptiles remain dormant till spring. The frog is the first to emerge, appearing somewhat conspicuously in the ponds at the end of February.

For our special purpose, the wild quadrupeds may be divided into two divisions, the active and the passive, or hibernating contingent.

Quite a large number of mammals still take their customary walks abroad after nightfall, as the footprints in the snow amply testify.

The carnivores, weasels in particular, are active. At this season their furry coats become extra thick, and with every bank tenanted by sleeping "small deer," they easily gain a livelihood.

The most familiar example of the hibernating mammal is the dormouse. Previous to its retirement to a round nest constructed in the "stub" of dense undergrowth, the "sleeper" of the Kentish schoolboys follows the approved fashion, and waxes fat on a diet of autumn

fruits. Both the dormouse and the squirrel, which behaves in a similar manner, wisely provide themselves with a concealed store with a view to the time of awakening.

Another sound sleeper is the hedgehog. He takes no precautions, but merely rolls himself amongst the dead leaves in the first convenient hollow. When the dogs unearth him, he is apparently a ball of leaves. Shrews and voles hibernate, so it is stated. Nevertheless, in localities where the water-shrew and water-vole are plentiful, it is a common occurrence to see both these creatures in the depth of winter, foraging on the banks of the ice-fringed brooks.

The birds, which I have purposely left until last, are perhaps the most interesting creatures to observe.

Without exception, all are active during the winter, though, seeing that mammals, higher in the scale of creation, hibernate, there should be no reason why they should not do so likewise. Probably they would be compelled to do so if Nature had not provided them with efficient means of locomotion, enabling them to range over a wide area.

Birds apparently suffer no direct inconvenience from the extremes of temperature. Thrushes and starlings will perform their ablutions as long as the water remains open.

As a matter of fact, they are peculiarly adapted at this season to withstand the vagaries of our weather.

From August onward till the end of autumn, the birds unconsciously prepare themselves for the coming winter.

Firstly, there is that wonderful operation known as the moult.

By this process the bird gains a completely new outfit at a most opportune time. The wing quills so essential to the creature's existence are renewed; all the old plumage, frayed by twelve months of hard wear, is discarded, and in its place there appears a new coat, comparatively sombre maybe, but compact and thoroughly reliable in its entirety.

The proverbial fruitfulness of autumn undoubtedly exercises a beneficial effect on the constitutions of our native birds. Released from nesting cares they have every opportunity, young birds particularly, to build up the body, and, in training parlance, "get fit." Unfortunately for my simile, with regard to birds this implies corporeal accumulation, but autumn plumpness is conducive to winter comfort. Amateur taxidermists are doubtless unpleasantly aware of this seasonable peculiarity of the birds.

Famine is the great drawback of the winter months. With feathers cunningly ruffled out so as to retain the maximum covering of warmth-bearing air, the birds sleep snugly, but if they wake morning after morning to find the supplies of nourishment locked away beneath ice and snow, it is evident that their reserve of strength must soon dwindle. It is significant that the ground-frequenting soft-billed birds, native and alien, are the first to suffer during prolonged frost.

To counteract this possibility, there is yet another autumn preparation, marvellously simple, yet not common to all—migration.

Autumn migration is nothing more nor less than a sensible expedient.

When certain birds note the signs, the keen wind and the chilly nights, which betoken the coming scarcity of food, they wisely quit in time, and move a short distance south into a more hospitable zone.

It is obvious that swallows, warblers, and other of the insectivorous birds could not possibly survive our barren winter, hence they overcome the difficulty by retreat.

So much for precautionary measures beforehand.

During the reign of winter, the birds which remain in this country have to be continually on the alert, otherwise they fare badly.

We are all familiar with the manner in which they visit the vicinity of houses in hard weather. This apparently trivial circumstance is really a wise manœuvre on the part of the visitors that augment the ranks of the usual tits and robins. The farm with its outhouses, offal heaps, and rick-yards, offers great attractions in the way of hibernated insects and odd scraps.

Then there is the interesting phenomena of local migration, practically the same as the foregoing, but on a much larger scale, though not so extended as true or foreign migration.

The freezing of their aquatic haunts drives the water birds into districts where they are otherwise strangers.

Our wise friends the black-headed gulls find it profitable to work along the estuaries, and ultimately up the rivers, in search of the abundant flotsam and jetsam; hence their presence inland.

Every winter the flocking of kindred birds is a noticeable feature of the countryside, primarily due to the same cause.

Perhaps the most delightful examples of these mutual benefit societies are the little parties of tits, which minutely examine each orchard tree, keeping well together, and sometimes accompanied by tree-creepers and goldcrests, strangers of similar habits.

And so we could multiply instances of winter expedients *ad lib.*, all of which are due to the stress of circumstances.

NOTES OF LESSONS ON NUTS.

Class.—The upper standards of either urban or rural schools.

Time.—Two or three lessons of thirty minutes each.

Object.—These lessons must be modified and adapted to suit the requirements of each particular school. Thus, in the case of children in large towns who have few opportunities of studying Nature face to face, these lessons should serve to awaken the imagination and thought; for children in the country, new pleasures should be added to the delights of a nutting excursion in the autumn woods; while those who study systematic botany will learn not to jump at hasty conclusions from superficial observations, for although the casual observer classes the hazel, the walnut, and the almond together as nuts, we shall find they are not all alike.

Step I. Preparation.—Before commencing the lesson it will be necessary to revise what has already been learned on the subject of Fruit.

We found that the "fruit" was the result of changes that took place in the pistil of the flower due to the fertilisation of the ovules in the ovary by the pollen from the stamens which had been conveyed by the wind or by insects searching for honey. The wall of the fruit is called the pericarp, and in most cases it is divided into three layers—(1) the epicarp or outer layer; (2) the mesocarp or middle layer; (3) the endo-

carp or inner layer. The character of the ripe pericarp serves to divide fruits into two classes—(1) Succulent fruits, having a soft, juicy pericarp; (2) Dry fruits, having the pericarp hard and dry. The succulent fruits are further subdivided into two classes—(1) Drupes having a succulent epicarp and mesocarp, but a hard endocarp, like the cherry, plum, &c.; (2) Berries having the whole pericarp soft and succulent, like the grape, tomato, &c.

Specimens should be shown of hazel-nuts, beech-masts, horse-chestnuts, and walnuts in the natural state as they grow on the tree; if possible, these should be obtained by the children themselves; Brazil-nuts, almonds, nutmegs, &c., should also be shown.

Step II. Presentation.—When we searched the woods in March we found the catkins hanging on the hazel-tree, and we saw how every gust of wind shook the golden pollen into the ovaries or seed-boxes. Those that have been able to watch the changes that took place during the summer have seen these little seed-boxes gradually increase in size until, when we visit the woods in autumn, we find clusters of nuts in place of the tiny red flowers. The nut, then, is a fruit, and is developed in just the same way as the cherry or the grape by the fertilisation of the ovaries.

Let us gather a cluster of hazel-nuts and examine them a little more closely. The first point that strikes us is that each one rests in a leafy cup; this is not a part of the nut, but is formed by the growth of the bracts which surround the ovary. We shall find these developed bracts also on the acorn and the beech-mast; in the case of the acorn they have grown into that pretty little cup that children are so fond of playing with, while in the beech-mast they form a prickly covering, which serves to protect the nut from the squirrels and field-mice, who would otherwise eat it while the shell is soft and green; afterwards, when the nut is ripe, this covering brings about the distribution of the seeds by clinging to the coats of animals, who carry them away, and they afterwards fall on clear, open ground instead of remaining under the shadow of the parent tree.

Having removed the nut from the leafy cup, we see that it is a true fruit, with the two essential parts the seed and the pericarp. In this case the pericarp is quite hard and dry, and very different to the succulent pericarp of the plum or the grape, so that we have no difficulty in classifying nuts as Dry Fruits.

When we compared the tomato and the gooseberry, we found that the former was a superior and the latter an inferior fruit, that is to say, in the tomato plant the fruit is formed beyond the calyx, the remains of which may be seen adhering to the base of the ripe tomato, while the gooseberry has only a plain stalk at the base, the position of the calyx being indicated by the little brown tuft at the top. To which of these two divisions does the nut belong? Perhaps the beech-mast will enable us to answer this question most readily, for if we remove the nut from its prickly coat, we find at the top a little tuft of hairs corresponding to the brown tuft at the top of the gooseberry, thus showing that the nut is an inferior fruit.

There is still one point to decide before we can define what is meant by a nut. When we considered the different ways in which plants scatter their seeds, we saw that in some dry fruits the pericarp opens to allow the seeds to escape, such fruits being said to be dehiscent. It does not require much thought, however, to know that the nut is an indehiscent fruit, for if the pericarp or shell opened naturally, we should not require nutcrackers in order to get at the kernel. We can now define a nut as a dry, inferior, one-chambered fruit, with a hard pericarp which does not open when ripe.

If we search the ground beneath the branches of a spreading oak-tree, we are certain to find an acorn that has sunk into the earth and commenced to shoot. This should be removed by carefully digging around the plant so as not to injure the roots. In this way we shall be able to see how a nut begins to grow into a large tree, and if the sapling is planted in a pot or suitably arranged for water-culture, it will form an interesting object for the schoolroom. We notice that the shell of the acorn has split, and from this opening the slender white roots have pushed themselves until at last they are strong enough to draw nourishment from the ground. Then the stalk comes out and begins to grow upwards until it reaches the air, when it puts out its tiny leaves; these are white at first, but they soon turn green, and are then able to obtain the nourishment from the air that serves to build up the mighty oak-tree. But how did the plant obtain its nourishment before it was strong enough to draw it from the air and soil? It is in order to provide this nourishment that the nut has the large oily kernel which boys and girls are so fond of eating, and if we examine what is left of the acorn on the plant we dug up, we shall most probably find that the whole of the kernel has disappeared, having been used up by the rootlets.

Step III. Association.—Having found what are the essential features of a true nut, let us see whether it is right to apply the name to all the "nuts" that make their appearance on the dinner table as dessert at this time of the year.

The Walnut.—As we crack our walnuts and hazel-nuts after dinner, there does not appear to be any difference in structure between them. Both have a hard shell, and when that is removed we find inside of each a kernel covered with a brown skin; surely, then, the walnut must be a "nut." Wait a moment, and let us see whether we have got the whole fruit. Here is a walnut just as it grows on the tree; how different it is to the walnuts we see in the shops; it looks more like a green plum than a nut, for it is covered with a green rind. This green covering differs from the cupule of the hazel-nut in that it is part of the fruit itself; in fact, it corresponds to the fleshy part of the plum, while the so-called nut represents the plum-stone. So the walnut is not a "nut," but a drupe. When walnuts are to be used for pickling, they are gathered before they are ripe, while the shell is quite soft, and in this case the whole fruit is eaten.

The almond and the cocoanut are other examples of so-called nuts which are really the stones of drupes. Almond trees are common in this country, and very beautiful they look with their masses of pink flowers, which appear in the early spring before the leaves; but our climate is too cold for the fruit to ripen, most of our almonds being obtained from Spain and the countries around the Mediterranean. The fruit is a drupe, but the mesocarp is dry and tough and quite useless for food, and is therefore removed before the almond is exported.

The cocoanut is another drupe, but in this case the mesocarp is fibrous, and supplies us with strong fibres which are used for making mats.

Brazil-nuts are great favourites with boys and girls, but they are not really nuts at all, but seeds which grow within a large fruit, just as the seeds grow inside a gooseberry, the hard shell of the Brazil-nut being the testa or outer skin of the seed.

Step IV. Formulation.—1. A nut is an inferior, one-celled fruit, having a hard pericarp, which does not open when ripe; it is usually contained in a cupule.

2. The kernel of the nut contains a store of nourishment to sustain the plant until it is strong enough to draw its own nourishment from the soil and the air.

3. The walnut, the almond, and the cocoanut are not true nuts, but are the "stones" of drupes.

4. The Brazil-nut is the seed of a large fruit.

Step V. Application.—The outcome of these lessons should be seen in the interest shown by the scholars in everything connected with the subject; the nutting excursion will no longer be simply a merry scamper through the wood, and the nuts themselves will afford exercise for the scholars' minds as well as for their teeth.

OBJECT-LESSONS IN HISTORY.

GREENWICH.

CONSIDERING the ease with which London boys can pay a visit to Greenwich, it was perfectly astonishing to see how few boys in the class had ever been there, and with what eagerness the proposed trip was looked forward to.

We arranged accordingly to spend a day at Greenwich, and to take circular tickets from Westminster Pier, which enabled us to go by the London County Council's new steamboats, and return by their tramcar, making, in fact, just the round that the Prince of Wales took when he inaugurated the steamboat service.

Our object is Greenwich, but as we cross Trafalgar Square we cannot forbear an inspection of Nelson's Column, for the naval hero is closely associated with Greenwich; but we draw the line at the monuments of General Gordon, &c., with the promise that we will one day make a round of the public monuments of London such as they are, for the British capital is sadly behind in tributes to great Britons.

On passing down Whitehall the attention of the boys naturally runs over to the two lifeguardsmen placed as mounted sentries at the sides of the gateway, but we cannot let them pass the Banqueting Hall, the only remaining part of Whitehall Palace, without calling their attention to this interesting building, pointing out in particular the fourth window, which was the one from which King Charles I. stepped on to the scaffold on which he was executed. We also point out the arrangement of little flags at present fluttering over the entrance. They are a copy of Nelson's famous signal hoisted at the Battle of Trafalgar, and we advise the boys to go to the United Service Museum, which is now installed in Whitehall, where they will find the collection, which at all times has a wonderful fascination for British boys, now enriched by a loan collection of Nelson relics, this being the centenary of the Battle of Trafalgar.

We only cast a glance across at the Abbey—a history lesson in itself—and the Houses of Parliament, pointing out that the building adjoining the Houses of Parliament is Westminster Hall, where so many historical events have taken place, including the trial of Charles I., and the recent entertainment of French naval officers.

We pass the statue of Queen Boadicea, and have time for a few remarks on her as we wait for the steamboat to come up. The boat that comes up first is the *Christopher Wren*, and here we may point out that the London County Council not only looks after education by administering the schools, but provides

GREENWICH HOSPITAL.

object lessons in history by naming the steamboats after citizens of London who have made a name in history. The arrival of the *Christopher Wren* is particularly opportune, and affords an occasion for a chat on the great architect who not only designed a part of the building we are going to visit, but also planned and superintended the building of St. Paul's Cathedral and many churches and monuments, including the Monument of the Great Fire. We tell the boys to try and visit the Crypt of St. Paul's, where they will see the modest tomb of Wren with the inscription "Lector, si monumentum quaeris, circumspice"—Reader, if you want to see his monument, look around you.

We pass numerous historical buildings as we glide down the stream, each of which would serve as a peg to hang a history lesson on. The Savoy Hotel stands out so prominently that it nearly obscures the Chapel Royal and the little that remains of the Palace of the Savoy. In this palace lived John of Gaunt, and as he was the special object of the hatred of the peasants under Wat Tyler his palace was burned by them while they were in possession of London. A reference to the accession of Henry IV. makes it clear to the boys how the estates of the Duchy of Lancaster came into

the possession of the Crown, and why this particular part of London is under the administration of the Chancellor of the Duchy of Lancaster.

The fine frontage of Somerset House towards the river attracts the attention of the boys, and although

THE HOUSE OF PLEASURE.

it is not the original building it leads to a discussion on the Protector who built on that site a house which the present one has replaced.

We soon reach London Bridge, on the site of the original one which figures so often in history, and on which the heads of political prisoners so often formed a grim ornament; but before we pass under we call attention to St. Saviour's Church, which contains the tomb of the poet Gower, and which was recently inaugurated as the Cathedral of the new diocese of Southwark by the King.

After passing London Bridge we see Billingsgate Market, where the fish consumed by Londoners is sold, and we call attention to two Dutch fishing boats moored off the market. They are not very grand specimens of boats, it is true, but the Dutch have by treaty the right to moor the boats there, but if once they left the place vacant the right would lapse; hence they never allow one of the boats to go away until another is there to take its place, and maintain the claim.

From the boat we get a particularly fine view of the Traitors' Gate of the Tower of London, but as we have promised ourselves a special visit to the Tower itself, and as the great Tower Bridge is opening to allow one of the Batavier steamers to proceed on its voyage to Holland, we have very little to say about the

> "Towers of Julius, London's lasting shame,
> With many a foul and midnight murder fed."

We are fortunate in seeing a good number of ships on the move, which makes the journey pass all too quickly, and we soon seem to reach Greenwich Pier.

Immediately behind the pier rises the Hospital, and we first take a stroll all round the outside of it, while we go over the points of history told in the lesson previously. We refer to the plan, and point out the Park to the south of the Hospital, and Blackheath to the south of that. The boys remember that the Danes encamped at Greenwich and on Blackheath in the reign of Ethelred the Unready, and that they twice laid siege to London. St. Alphage, Archbishop of Canterbury, fled from the Danes, but was taken and killed on the site of the present parish church of Greenwich. Blackheath was also the site of the camp of Wat Tyler and his companions as they marched to London.

The land in this neighbourhood was claimed by the Crown, and in 1433 King Henry VI. made a grant of a large tract to Humphrey, Duke of Gloucester, who formed the Park, and built a castle on Observatory Hill. This was probably the most suitable place to resist an attack from armed enemies. But he also erected a palace on the site of the north-west wing of the present Hospital, which was such a pleasant spot that he called it the "Placentia."

Henry VIII. was born at Greenwich in 1491, and was baptized in the parish church. He seems to have been very fond of Greenwich, and many royal festivals were held there. In 1509 Henry was married at Greenwich to Catherine of Arragon, and in 1515 Princess, afterwards Queen, Mary was born here, and in the same year the king's sister, Mary, who had previously been married to the King of France, was married to Charles Brandon, Duke of Suffolk. On September 7th, 1533, the Princess Elizabeth, afterwards Queen, was born at Greenwich, and after a tournament, which took place on May Day, 1536,

THE ROYAL NAVAL SCHOOL.

Anne Boleyn was arrested by the King's order and taken to the Tower.

In 1540 King Henry was married here to Anne of Cleves. Queen Elizabeth spent a fair amount of

time at Greenwich, and at Greenwich she received Sir Francis Drake after his voyage round the world; and we are reminded as we step into a puddle in crossing the road that it was here that Walter Raleigh sacrificed his best cloak to save the Queen's shoes as she was entering the Placentia. We have a good deal to say about Drake and Raleigh.

King James I. enlarged the Palace, and his Queen, Anne of Denmark, began to build what was called "The House of Delight" near the Park. One boy, who had been reading the *Fortunes of Nigel*, then told us the scene in that novel which is laid at Greenwich.

Charles I. spent a good deal of his time in the Palace before the outbreak of the Civil War, and his Queen, Henrietta Maria, finished the "House of Delight," which now forms the central part of the Royal Hospital School, and is shown in our illustration.

After the Restoration, Charles II. pulled down the Placentia, and from the designs of Inigo Jones began to erect a new palace a little to the south-west of the site of the old one. This is still called King Charles's Building. We visit it, and also examine the additions made by Sir Christopher Wren, when Queen Mary persuaded William III. to provide a Hospital for disabled seamen. This was one way in which the Queen sought to secure the loyalty of the Navy at a time when there was a risk of the ships going over to the ex-king James. We point out that the estates of the Earl of Derwentwater and others who took up arms for the Pretender were applied to the maintenance of the Hospital.

In 1805 the body of Lord Nelson was brought to Greenwich, and lay in state in the Painted Hall on January 5th, 6th, and 7th, 1806, previously to burial in St. Paul's Cathedral.

In 1853 there were no fewer than 2710 old seamen in the Hospital, but in 1865 they were dismissed to their homes with pensions, and the premises converted into the Royal Naval College for Naval Officers.

We have spent a good deal of time in contemplating the outside of the building and reviewing the historical facts connected with it, and we have now strolled round to the western entrance to the Hospital. The boys are very much struck with the two great globes by which the stone piers of the gates are surmounted. The celestial globe is inlaid with a number of copper circles representing meridians, the equinoctial, ecliptic, the tropics, and the polar circles. The terrestrial globe is inlaid in the same way with circles representing the meredians and parallels of latitude. The globes are of stone, six feet in diameter, and are inclined at an angle of 51°, *i.e.* the latitude of Greenwich.

As we enter we see on our right the Dreadnought Hospital for seamen of all nations. This is so called because up to 1870 the sick sailors were attended to in an old wooden battleship called the *Dreadnought*, which was moored off Greenwich. We can see some of the patients who are on the way to recovery enjoying the fresh air in the verandah outside. There may have been a sort of sentiment in favour of tending sick sailors in an old ship of war, but no doubt the present premises are much more convenient.

We observe the large marble statue of George II. which stands in the middle of the great square, and then make for the Painted Hall in King William's building. With the help of a guide-book we are able to work out the allegorical representation of the Death of Nelson, designed by West, and carved in high relief under his own supervision. We recognise Britannia in the centre seated on a sea-girt rock, and also Neptune, who is directing one of his Tritons to present to Britannia the dead body of Nelson. The body is supported by Victory, who at the same time is presenting to Britannia the trident of Neptune in token that she is to rule the waves. Just behind Neptune, who is drawn by sea-horses, is a British sailor, who points out that Nelson died at "Trafalgar." In front and to the left is a British lion holding in his paws a tablet with the inscription "Nelson, 122 battles." We are unable to name more than a tenth part of these, but the attempt to recall the chief was a useful exercise. Behind the lion is a naval genius recording the victories of the Nile and Copenhagen. The three sister kingdoms, England, Ireland, and Scotland, are represented as affectionately joining in expressing their grief at the loss of the hero.

Inside the hall we study the beautiful ceiling until our necks ache, and then discuss the naval engagements depicted on the canvases. It is surprising to find how much the boys remember of their history, although, of course, battles are the events in history that appeal most to boys.

Many points, however, have to be entered in the note-books for future research. The pictures that gave most pleasure were—Nelson boarding the *St. Nicholas*, The Battle of Aboukir, Turner's Battle of Trafalgar, The Death of Captain Cook, and Lord Howe's Victory off Ushant. The portraits of admirals were much admired, in many cases for their artistic merit as well as on account of the men of whom they are the "counterfeit presentment." Among them we may mention Reynolds's picture of Admiral Barrington, Gainsborough's Earl of Sandwich, Lely's General Monk and Admiral Penn, as well as the portraits of Jervis, Hood, Cook, Kempenfelt of the *Royal George*, and Collingwood, while the portrait of James II. reminded us that, however much we may condemn his arbitrary acts, we must not forget that, as Duke of York, he fought bravely for his country against the Dutch. The pictures and relics of Nelson were really worth a visit by themselves.

Crossing the quadrangle we went into the Museum, and came to the conclusion that the Franklin collection belonged more to geography than to history, so the boys made numerous entries in their note-books to serve as material for a lesson on Arctic discovery.

The model showing the disposition of the ships at the Battle of Trafalgar was explained, and then the boys were given half-an-hour to look at the models of ships as a sort of relaxation.

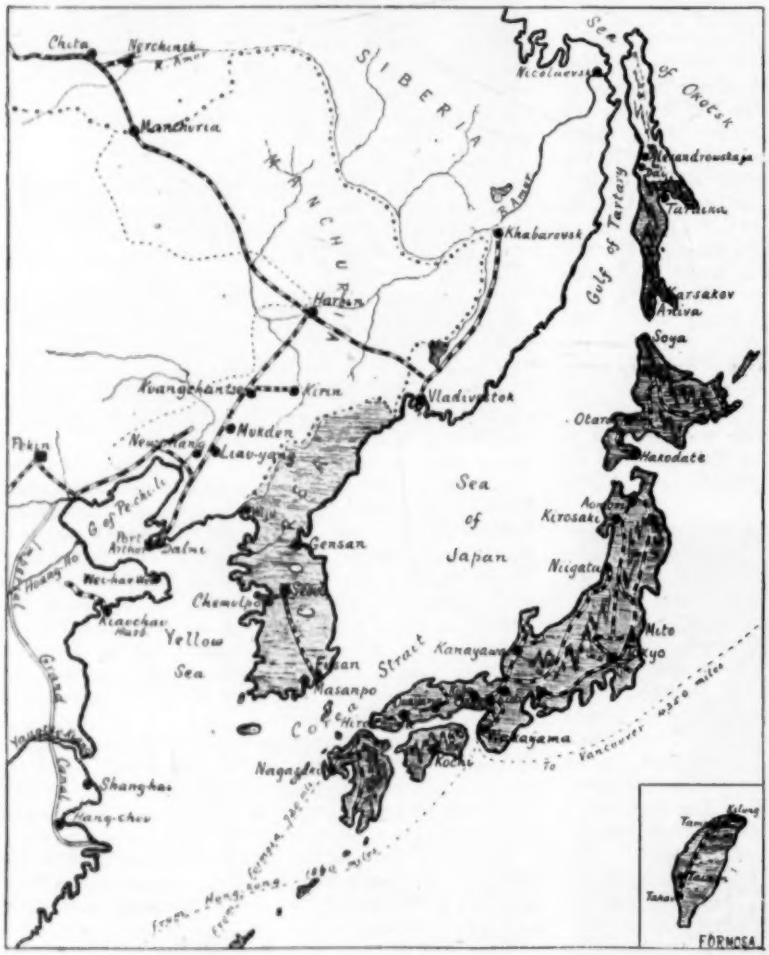
Time just allowed of a look at the outside of the Royal Naval School, where the boys were at play, and after a climb up Observatory Hill, where watches were set by "Greenwich Mean Time," we took a peep at Blackheath, and started on the homeward journey by tram.

On the way the boys tried the plan of shutting their eyes from time to time and forgetting the present appearance of Old Kent Road—known to them through a certain song at one time popular—and trying to recall the appearance of the road hundreds of years ago, when Wat Tyler and other historical characters proceeded along the road from Kent to London. It was a difficult task, but it is good for boys and good for us all occasionally to lift the mind from its everyday surroundings.

OUR ILLUSTRATED GEOGRAPHICAL NOTE-BOOK.

GREATER JAPAN.

THE story of the development of a great political entity is always a matter for profitable contemplation. Ordinarily the process is slow, and one is able to note carefully the evolutionary processes; but in the case of Japan the growth has been so phenomenally rapid that the study becomes one of absorbing interest to the student of social and political economy.



The history of Japan previous to 500 A.D. is mere legendary conjecture. About 550 the Koreans introduced Buddhism, and during the next century the Chinese influenced the country very considerably. Foreigners were rigidly excluded until 1543, when the Portuguese effected a settlement; but in less than a century all foreigners were again driven out and Christianity was laid under an interdict. In 1852 the United States sent an expedition to open up commercial relations with Japan. In view of recent events it is amusing to learn that the Mikado was presented with a toy railway and a steam-engine, a printing press, opera glasses, and a quantity of American whisky. Other nations speedily followed the American example, and a number of ports were opened to foreign commerce. In 1863 a young Japanese escaped from his country to Shanghai, and proceeded to various foreign countries in search of knowledge that might prove beneficial to his native land. This was the Marquis Ito, who, during the forty years he has been in office, has constantly urged measures of improvement and reform. A revolution in 1867–8, and the final breaking up of the feudal system in 1871, paved the way for the promulgation of a constitutional system of government. By this constitution the Mikado is the head of the Empire. The Imperial Diet consists of a House of Peers and a House of Representatives; but the Emperor can open, close, or prorogue the Imperial Diet, he can dissolve the House of Representatives, he can declare war, and make peace, and conclude treaties. Notwithstanding his great power and the narrowing influences of his position in his earlier years the Mikado has proved himself to be an able man, and progressive ideas have found in him a warm advocate.

Japan and Russia.—During the last quarter of a century Japanese progress has been one of the wonders of modern politics. Her energies have been constantly devoted to secure the commercial supremacy of the Pacific. But there was a cloud in the firmament of Japan's hopes and aspirations, for Russian aggression in the Far East threatened the consummation of the national ambition. Though Russian policy in Asia was always one of steady expansion, open encroachment upon Manchuria scarcely seemed within the range of practical politics in face of the avowed desire of the Great Powers to assure the integrity of China. But Russian diplomacy is utterly unscrupulous in the use of covert methods of securing her ends, and Manchuria, slowly but surely, was becoming Russianised.

The war between Japan and China in 1894–5 had two main objects—the reform of China and the rescue of Manchuria from Russian domination. Japan forced China to grant independence to Korea and to cede to herself Port Arthur and Lia-o-tong. But Russia intervened, and compelled Japan to forego the fruits of victory on the ground that if she occupied the Lia-o-tong peninsula it would "constitute a perpetual menace to the capital of China and render the independence of Korea illusory." A great factor in securing the Japanese withdrawal was the assurance that Russia had no designs upon Manchuria. No sooner had the Japanese evacuated Port Arthur than

a Russian fleet put in "to spend the winter months," and a few months later China granted to Russia a lease of the Lia-o-tong, with the right to erect fortifications. Notwithstanding pledges and assurances of all kinds a Russian railway was constructed across Manchuria, with Cossack garrisons and settlements all along the line, and to all intents and purposes the province was treated as Russian territory.

Japan was prepared to assert her rights, but the Boxer rising of 1900 occurred, and the Japanese assisted in the relief of the Legations at Pekin. Thanks to Russian intrigue China escaped punishment for the atrocities connected with the rising. Russia for her support desired still more concessions in Manchuria, but did not succeed, and agreed to withdraw from the province in October 1903. A treaty, in 1895, between Russia and Japan provided that the two powers jointly should control Korea with a view to reform. Russia shirked her responsibilities, and in 1900 was attempting to obtain Masanpo. It seemed as though Korea would suffer the same fate as Manchuria.

During all these breaches of faith Japan exhibited great patience and restraint, although the situation was fraught with positive danger to her national well-being. An American writer succinctly painted the real inwardness of the "Russian Peril": "Having entered Manchuria, Russia had no intention of leaving. She is now established along the frontiers, her forts built, and her navies in the eastern harbours of Asia. The Manchurians and Mongols furnish splendid fighting material. They can be subsisted and kept satisfied with a total expenditure of from five to eight times less cost than the American soldier; and the Russians have the officers ready to put over them. Let Russia annex 400 millions of Chinese subjects and with this low-priced labour build armaments; then India and Persia are certain to fall. If Russia should be permitted to retain her position in Manchuria the Cossack will presently hold the world by brute force. Either America and Southern Europe must fight Russia at this time, or concede to her all of Asia." Japan recognised her danger and determined to submit her national existence to the arbitrament of war. The operations on land and sea were marked by a succession of Japanese victories without parallel in history, and in the end Christian Russia was compelled to make terms with pagan Japan.

Japan's Guerdon.—By the terms of the Peace Treaty Japan gains far more than her moderate demands before the declaration of war:—

1. Russia recognises the preponderating interests of Japan in Korea from political, military, and economic points of view, and will not oppose measures of guidance, protection, and control which Japan shall consider it necessary to take in Korea in agreement with the Korean Government.

2. The lease over Port Arthur and Dalny and the adjacent territories and waters passes in its entirety to Japan.

3. Russia and Japan pledge themselves to put no obstacle in the way of such general measures as China may take for the development of industry and commerce in Manchuria.

4. The Manchurian Railway is divided between Russia and Japan at the station of Kuangchantse. Both sections to be employed for commercial and industrial purposes only.

5. Russia cedes to Japan the southern half of the island of Saghalien as far as the 50th parallel of northern latitude.

Japan in its protectorate over Korea gains territory equal to half that which it possessed before the war. The possession of Port Arthur and Dalny affords them the strongest maritime position in the Far East. The regaining of half of Saghalien precludes almost any possibility of attack in the future from the direction of Siberia. Manchuria restored to China may, in the course of the next ten years, under Japanese guidance and tuition become a mighty barrier between Russia and Japan. Flushed with victory, Japan might have been pardoned had she stubbornly insisted upon other concessions, but by her moderation and magnanimity she has crowned her great achievement with a dignity beyond all praise. Henceforth the power of Japan cannot be questioned. Unaided she has defeated a power assumed to be the strongest in Europe, and in all probability has freed herself from all possibilities of menace for long years to come.

Industry and Commerce.—The industry and commerce of Japan have increased by leaps and bounds. In some branches of manufacture Japan is already competing with European nations in the great markets of the world. In this respect cotton provides a most promising field for Japanese exploitation, and the following figures show the progress that has been made during the last few years:—

	Mills.	Spindles.	Cotton Piece Goods.
1893. . .	40	381,000	87,461,200 lbs.
1903. . .	76	1,290,000	320,784,000 ,,

In 1894 the total value of woven piece goods amounted to £7,200,000; in 1902, £15,700,000.

Between 1893 and 1903 the production of copper, iron, and lead was doubled; coal rose from 3 to 10 million tons; and petroleum from about 4 million to over 42 million gallons.

The expansion of Japanese foreign trade is shown in the following instructive figures (in million yen):—

Exports to	1895.	1904.	Imports from	1895.	1904.
Great Britain .	8	18	Great Britain .	45	75
France . .	22	36	France . .	5	3
Germany . .	3	4	Germany . .	12	28
United States .	54	101	United States .	9	58
Australia . .	1	4	Australia . .	1	4

TOTAL FOREIGN TRADE (IN MILLION YEN).

	Exports.	Imports.	Total.
1895	136	129	265
1904	319	371	690

Between 1893 and 1904 the export trade increased 28-fold with Asia, 25-fold with America, but only 6½-fold with Europe; the rate of increase in the import trade was 19, 58, and 7-fold respectively. European trade shows comparatively less increase, as it reached a high degree of development in the early days of Japanese foreign trade. On the other hand, China, Korea, and India now demand Japanese goods; and the American trade, owing to improved communications, shows corresponding vitality. The completion of the Panama Canal will stimulate Japanese trade with America, especially Brazil and the Argentine; and new markets in West Africa will become the more accessible.

If Japan but maintains her present rate of progress

she will do well, but, freed from the war cloud, she will be able to devote her energies to the furtherance of her commercial interests.

A Land without Religion.—In the western sense of the word there is no religion in Japan. Its substitute is Bushido, which is simply a code of honour bound up with hero and ancestor worship. Bushido is excellent as far as it goes, but it is confined to a very small section of the community. The result is, that the country is handicapped by the prevailing low standard of commercial morality. Many persons are in favour of Christianity being adopted as the State religion of the country. A commission of Japanese statesmen visited Europe to study civilisation, and upon their return recommended Christianity. In the recent war a number of native Christians accompanied the troops as chaplains, and the British and Foreign Bible Society was allowed to present to the Japanese soldiers copies of the New Testament in the native tongue. Christians, of whom there are about 100,000, are allowed full liberty of worship and all rights of citizenship.

Japanese Expansion.—Recent events may have a wider significance than is immediately recognised. The elevation of Japan to one of the great world powers, with whom Great Britain does not hesitate to closely ally herself, will surely cause some modification in the attitude towards Japanese immigrants in various parts of the British Empire. Australians would probably have preferred the victory of Russia. It is scarcely compatible with friendship for a portion of the British Empire, with only two persons to the square mile, and a population that only increases by half a million in ten years, to be closed to Japan, whose population increases by half a million yearly. The Pacific naturally presents to Japan the most convenient outlet for her surplus population, and the question opens up interesting possibilities. There is the great Lone Continent silently inviting human energy and intelligence in the production of wealth; so far a mere handful of people respond to the invitation. It seems possible to admit into Australia a large number of desirable Japanese without endangering the interests of the white population.

Korea.—Korea, the cockpit of the East, has an area of 82,000 square miles, and a population of between 10 and 15 millions. It is a land of islands, harbours, and mountains, with slopes coming down to the sea. At Gensan the tide rarely exceeds two feet; at Chemulpo it rises to 33 feet. The climate is generally healthy, but more extreme than in corresponding latitudes in Europe. More than 70 per cent. of the people are engaged in agriculture; and it is, doubtless, destined to become the granary of Japan. Farming is closely allied with other occupations. The same families that raise cotton, silk, flax, &c., also convert the raw material into the finished fabric; and nearly all the articles for domestic use are the handiwork of farming households in their spare time. The principal products are rice, wheat, beans, grain of all kinds, cotton, hemp, ginseng (a medicinal root), sesame (oil seeds), tobacco, &c. At present the methods of cultivation are exceedingly primitive.

The Koreans are "peculiarly proficient in the art of doing nothing gracefully." The very embodiment of calm, leisure, and serenity, of all the peoples of the East they are the most dignified and the least commercial—and the most drunken. Notwithstanding their pronounced hatred of foreigners, they are amiable and hospitable. The Korean woman is the great economic factor in the house and in the life of the nation. "She works that her superior lord and master may dwell in idleness, comparative luxury, and peace. She does the work of a man in the household and of a beast in the fields." The people are omnivorous eaters, and delight in all kinds of weird and malodorous dishes. Gluttony is a national weakness, and indigestion a national scourge.

Korean history dates back to 1122 B.C., when several thousands of Chinese colonists entered the country and introduced the inhabitants to Chinese arts and politics. The King of Korea became a vassal of China. At the end of the sixteenth century Roman Catholic missionaries entered the country; but in 1866 thousands of converts were massacred, and only three missionaries escaped with their lives. To avenge the death of its subjects France sent out an expedition, which ended in failure. Ten years later Japan effected a treaty with the "Hermit Kingdom."

At the end of the Chino-Japanese war the treaty of peace, signed at Shimonoseki in May 1895, secured the renunciation of the rights of China over Korea. Association with the Japanese has had a most stimulating effect upon Korean life and progress. Before the outbreak of the war with Russia there were about 25,000 Japanese in the country—a colony of 4000 adults in the capital alone. A railway from Chemulpo to Seoul was the first outcome of Japanese enterprise, followed by its extension to Fusan.

British interests in Korea have never been of great commercial or political importance. There are no direct imports from the country into the United Kingdom; and in 1900 our exports to Korea only amounted to £28,000 (cottons, £10,000). The United States, on the other hand, has pushed its trading interests with characteristic vigour. Germany and France obtained railway and mining concessions respectively, which were abandoned. Russian commercial schemes were chiefly a cloak for movements of political significance.

A new era now commences for the Koreans. Japan will be able to give effect to that expansion which she has so long desired without the ever-present shadow of Russia to restrict and repress her aims. That in the course of time Korea and its people may largely lose their identity is practically a foregone conclusion; but this will be atoned for by the development of the resources of the country, which is bound to follow Japanese domination.

Saghalien, or Sakhalin, is 670 miles long, with a breadth varying from 20 to 150 miles; area 29,300 square miles. The middle of the island is in the same latitude as Land's End, but the chilly, foggy Sea of Okotsk gives the land a raw and cold climate, very different to that of Cornwall. The rivers are only navigable for short distances. Petroleum, naphtha, and coal are abundant. The Japanese held the southern part of the island until 1875, when they ceded it to Russia in exchange for some of the Kurile Islands. The Russians attempted to colonise the island with convicts, a scheme that ended in failure, as the land presented no favourable features for agriculture. Four to five thousand convicts are now at work in the coal-mines. The total population is about 28,000, half of whom are Russians. Russian colonists will be allowed to remain in the southern portion of the island, but Japan will have the right to expel Russian convicts. The question of fishing rights in the Okotsk and Bering Seas will be settled by an agreement at a later stage.

TWO NEW CANADIAN PROVINCES

THE four North-West Territories, Assiniboia, Saskatchewan, Athabasca, and Alberta, have now been converted into two provinces. The boundaries between the old territories and the other provinces, British Columbia, &c., have been retained, while their mutual boundaries have been abolished, and the new line which divides the combined district into two provinces of practically equal size runs down the 110th meridian.

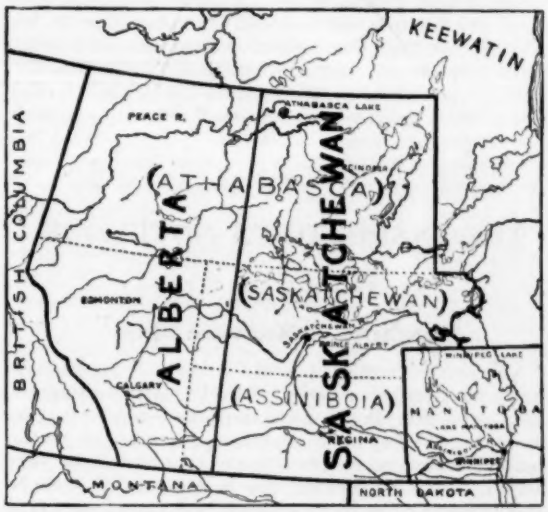
The inauguration of the new provinces took place at the beginning of last month at Edmonton, the new capital of Alberta, and Regina, the new capital of Saskatchewan, in the presence of the Governor-General and Sir Wilfred Laurier, the Premier. It marks the success that has attended the efforts of the Dominion Government to settle what was known as the "Great Lone Land," and which, until recently, was simply the home of the buffalo, and which even now are "lone" enough when measured by British standards of population, for the inhabitants number but about one to the square mile.

The Bills providing for the creation of the provinces were introduced by Sir Wilfrid Laurier as long ago as February last. The details show that the two Provinces will extend north to the 60th parallel, which is the northern boundary of British Columbia, east to the Manitoba boundary and a projection thereof, and that the division of the two will be formed by the 110th meridian, which passes a short distance east of the present Alberta boundary. Roughly speaking, the new Alberta will comprise the present territory of Alberta and half of Athabasca, while Saskatchewan will embrace Assiniboia, Saskatchewan, and the remaining half of Athabasca. Large as these two provinces will be, comprising about 550,345 square miles, they leave a territory of about the same area still unorganised to the north. Edmonton will be the provisional capital of Alberta, and Regina of Saskatchewan. It is estimated that there are at present about 250,000 people in each province.

The request of Manitoba for the extension of boundaries westward was refused, but a conference will be called to discuss the subject. The public lands of Saskatchewan and Alberta will remain in the hands of the Dominion, but compensation amounting to 37,500,000 dols. is to be given, to be increased as the population increases. This has been justified by Sir Wilfrid Laurier on the ground that land has always been held by the Federal Government, and that to make a change might prejudice the Government's immigration policy.

The southern portion of Alberta corresponds to the popular idea of a prairie, being almost devoid of timber and consisting of great rolling plains, provided with wood only along the streams and at the foot of the Rocky Mountains. The northern half of the new province is well wooded throughout, although there are stretches of prairie land interspersed among the forests. On the whole the soil consists of rich alluvial loam, resting on sand and gravel which here and there crop out on the surface. The climate is described as delightful, for although the thermometer shows considerable extremes, the summers being hot and dry, yet the winters are mild and there is very little snow. The rainfall averages only twelve inches a year, so that, except in the more favoured parts, the prospects of cereals and roots are not very good, yet the country seems to offer great promise as a grazing land.

Southern Alberta is essentially a ranching and dairying country, and offers unequalled opportunities for efforts in those directions. The high open plains are broken by valleys of numerous large streams, while the valleys and lowland plains produce a most luxuriant and nutritious growth of native grasses. Dairying is carried on with great success, the country being pre-eminently fitted for it. Though a large portion of Southern Alberta is bare of timber for fuel, this lack is amply compensated for by an inexhaustible supply of



coal of excellent quality. Irrigation is largely resorted to in producing grain and fodder crops, while during the past two or three years, great success has attended the growing of winter wheat. The district is traversed from east to west by the main line of the Canadian Pacific Railway, and there are several important centres of trade, chief amongst which are the city of Calgary, and the thriving towns of Lethbridge and Macleod.

So much has been said and written of Northern Alberta that it seems scarcely possible to put forth anything new. It is a country well wooded and watered, while from high points on the prairies flow springs of water that remain open all the year round. The scenery is of varied beauty, while inexhaustible supplies of coal underlie the whole country. A system of free public schools, similar to that which exists in all territorial districts, has been established, and the Government gives liberal support. Game is either rare or plentiful according to the locality and season. Mixed farming, ranching, and dairying are carried on with great success, and wonderful yields per acre of wheat, oats, and barley are reported. Blizzards and windstorms are unknown, and as a consequence a fine class of cattle can be raised. Edmonton, the most important town in Northern Alberta, lies on the north bank of the Saskatchewan River.

Saskatchewan is perhaps better known, as it lies farther east. It takes its name from the river Saskatchewan, and consists of great stretches of prairie and forest. It is better watered than its sister province, and in the numerous farm settlements that have already been taken up, wheat, oats, barley, and potatoes are

grown with great success, and the ordinary European vegetables give good crops. The average yield of wheat is about thirty bushels to the acre, while oats yield about twice as much. There is very little big game left, but small game is plentiful, especially in some parts. Large tracts of land have been purchased by land companies, but they sell it on very low terms, so that a man can soon secure the freehold of his own farm. Considering the sparse population the means of communication are very good, as the land is fairly level, the rivers form magnificent waterways, there are good roads, and the Canadian Pacific Railway and the new Grand Trunk Pacific, which is now building, will place every part within easy access. So promising is the outlook that large numbers of settlers are leaving the United States to better themselves in these fertile districts, where the skilful stock and dairy farmer seems likely to meet with marked success.

THE INSPECTOR'S NOTEBOOK.

BY AN INSPECTOR OF SCHOOLS.

Intelligent v. Mechanical Work.

ON several occasions lately I have discussed with teachers the question of Problematic Arithmetic, more especially that done in the lower standards. As the opinions they have expressed run counter to the general tendency, it occurs to me that it will be very helpful for us to consider the matter, and I shall be glad to receive the views of some of my readers. It is fashionable at present to almost ignore "mere computation," and to teach arithmetic entirely by means of problems with small numbers. We are swinging to the other end of the pendulum. The teacher who believes in mechanical work is spoken of scornfully as not "up to date." Personally I am in favour of the *via media*. The characteristic rush and vacillation of the age has contaminated the educationists. Let us hear the views of those who cry *Festina lente*. These rapid thinkers in the educational world are like the coffee-house politicians of William Hazlitt's time, who "ask with a face of dreary vacuity, 'Have you anything new?' and on receiving an answer in the negative have nothing further to say. [They are like an oyster at the ebb of the tide gaping for fresh *tidings*.]" I hold a watching brief for the moderates. However, let us cut the cackle and come to the horses. A friend of mine, as well-read a schoolmaster as one would meet in a Sabbath day's journey, who captains a large Council School attended by children of the *bourgeois*, tells me (1) That young children delight in doing long mechanical sums. (2) That they dislike these charming little problems. He argued the question well, and I am bound to confess that he made an impression on me, and at least I now feel that there are two sides to the question.

Take his first statement. He declares that he himself as a lad distinctly remembers revelling in the "mere computation" arithmetic of his day. He has carefully observed the effects of both kinds on the children in his school, and furthermore he has convinced himself, by observing his own children, that the popular problem may be the bane of many. There is too much brain irritation involved. Psychologically, for he is more than usually conversant with the views of the theorists, he declares it bad. Standards I. and II. cannot reason. Their brains have not sufficiently developed. Contrasting Euclid in a training college with arithmetic in schools, he reminds me that only a small percentage of students are able to solve the riders.

He is confident that boys and girls love learning *facts*, and generally doing what is considered unintelligent work. If that be so, surely those who say that children should be taught to love their schools should not decry the mechanical.

Again, take the educational system of handwork known as Sloyd, which is universally praised by all the new men. In *that* accuracy and attention to details is all important. Why should the ordinary subjects then be treated so casually?

I have now, I believe, fairly placed before you the views of quite a large number of thinking teachers. It is unfortunate that the fossilised are associated with them. My own experience goes some way to confirm much of what I have stated. I rarely if ever find more than five per cent. of Standards I. and II. able to solve the simplest new problem placed before them. They can work one like those they have had before, but surely that is only evidence of unintelligence. I am told that in some schools nearly the whole year is spent in problematic teaching by types, and at the end a new type plays havoc. If any of my readers will send me their experiences I shall be glad. Please accompany them with concise data.

I have another somewhat heterodox subject to bring before you. Our education is thought by a large number of people to be too bookish. They say we are training children to despise all kinds of manual labour. I quite agree that we should try and correct this obvious defect. In certain trades and occupations, I am told that the younger a boy begins the technical work the more skilled he will become. For instance, one of the finest violin makers in the world began to use the knife before he was ten, and declares to-day that had he entered the workshop at fourteen his muscles would never have accommodated themselves to the necessary work. Again, consider the lives of some of our ablest seamen. I will take Nelson and his school. Of Nelson himself we read—"He was only twelve when, without the formality of an examination, he became a midshipman. At fourteen he was captain's coxswain on the *Carcass* and on his way to the North Pole." Dr. Fitchett writes—"They (Nelson and his captains) were all caught young. Some of them began their sea career at ten years of age; Parker, Blackwood, Berry, Louis, and Nelson himself, were afloat at eleven; Hardy at twelve. These boys were taught to splice, knot, reef a sail, work a ship in sailing, shift his tides, keep a reckoning of a ship's way by plain sailing and Mercator's, observe by the sun or stars, find the variation of the compass, &c. A training which produced such results in a lad may have been scientific; it certainly owed little to books. It was practical and effective. It bred seamen." If one will think over these things coolly, one will see a glimmer of truth in the contentions of the much-abused farmer. Again I suggest that the *via media* is "the only way." Let us dovetail the practical with the theoretical more. Is the lad who occasionally stays home from his ill-

ventilated school to assist in the hayfield or tend cattle committing a great crime? Education is not confined to the four walls of a school.

NOTEBOOK QUERY COLUMN

Letters should be addressed—INSPECTOR, c/o THE EDITOR, 35 Paternoster Row. *The name and address must always be given. In urgent cases replies can be sent by post if two stamps are enclosed.*

Ajax seeks situation as assistant in a manual training school, and asks how such may be obtained.

Answer.—Take in the *Schoolmaster* (1d. weekly) and watch the advertisement columns. You should easily be able to get a post at once with your qualification.

Practice submits two methods of working a practice sum, and asks which is preferable.

Answer.—Please give name and address in future. Both methods are allowable. I certainly prefer the second. The first would only be used in the early stages.

THE CRUSADES.

BY HENRY SMART, M.A.

THE story of the Crusades has a wonderful hold upon the popular fancy. The chief actors are all more or less familiar to us. We feel that we do know Peter the Hermit, Leopold of Austria, Frederick of the Red Beard, and St. Louis of France. In the same way, some of the incidents of these wars are very real to us. The cry of "Deus Vult, Deus Vult" at Clermont, Richard I. planting his standard at Acre, Eleanor of Castile nursing her husband; these and other incidents are vividly impressed upon our imagination. Scott, with his instinct for the picturesque, has drawn largely upon these wars for his novels; and probably it is chiefly from his pages that we have learnt of the existence of such people as Count Robert of Paris, Archbishop Baldwin, and Conrad of Montferrat. These, in reality, may have been rather unimportant persons; but to readers of Scott—and who is not a reader of Scott?—they are familiar friends.

These remarkable wars had three distinct objects, one of which is always apparent, though the other two were none the less real. The first was, of course, to recover possession for Christian nations of the land where the Redeemer lived. In this respect they failed, for though Jerusalem was taken in 1099, yet, after remaining in Christian hands for nearly a century, it was lost and was never recovered, while in 1291 the "Franks" lost their last footing in the Holy Land by the fall of Acre. The second object was to heal the schism between the Eastern and Western Churches, and reduce the Patriarch of Constantinople to obedience to the Pope. Very little is heard of this purpose, but it is none the less important on that account. Except, however, for a brief space of time, this object was not accomplished, and in this respect the Crusades failed utterly. But with regard to the third object they were a great success. They drove back the Turks, and postponed the fall of the Eastern Empire for some centuries. When the First Crusade started, the Turks were already established on the other side of the Sea of Marmora, almost in sight of Constantinople; but, owing first to the Crusades, then to the Knights of St. John, and lastly to the defeat inflicted on Bajazet by Tamerlane at Angora in 1402, Constantinople did not fall till 1453.

It is a very interesting problem to study how the practice of pilgrimage arose, for it does not seem to be inculcated in the New Testament; but certainly the custom was well established by the end of the third century. Churches were built at Jerusalem and Bethlehem by the Emperor Constantine and his mother. Many great men spoke against the habit of pilgrimage, but some of these very men went and lived in the Holy Land. The identification, or, to use a word whose modern meaning is more appropriate than its old, the "invention" of the places and things mentioned in the Bible gave a stimulus to these journeyings. We have abundant proofs of the credulity of people during the Dark Ages, but even their credulity must have been tried when it was announced that the very tree up which Zacchæus climbed had been discovered.

The first check to pilgrims came in 611, when the King of Persia captured Jerusalem, and, it is said, put to death 90,000 Christians. Sixteen years later the Emperor Heraclius defeated the Persians at Nineveh, and in the following year peace was made, by which the true Cross, which had been carried off, was recovered.

But in 637 came a far greater calamity. The great event of the seventh century was, of course, the rise of Mohammedanism. Mohammed died in 632, and five years later the Caliph Omar entered Jerusalem. The terms he imposed were severe, though not unduly so. Christians were to build no new churches, the cross was not to be displayed outside buildings or in streets, Mohammedans were to be allowed in churches, and the use of saddles and weapons was forbidden to Christians. But though these terms made the lot of pilgrims to and Christian dwellers in Jerusalem somewhat hard, yet pilgrims continued to flock to the Holy City. Towards the end of the tenth century the conversion of Hungary opened a route formerly closed, and so gave increased facilities, while the expected end of the world gave increased desire. When the year 1000 passed and still the end of the world had not come, an outburst of piety led many more to Palestine. Fulk the Black made three journeys to the Holy Land, and at last died on his way home; Robert the Magnificent, the father of the Conqueror, journeyed thither, and died as he was returning; while another pilgrim with whom we are familiar was Sweyn, son of Godwin.

But then came the advance of the Turks. In 1076 they captured Jerusalem. The lot of pilgrims then became very different. Instead of being subject to a tax they had to submit to robbery and insult. It was reports of these hardships which inflamed the zeal of Western Europe, while two events gave Christians a good opportunity of striking a blow for possession of the sacred places. In 1081 Alexius Comnenus began to rule at Constantinople, and under his care the Eastern Empire revived; while in 1092, on the death of Malek Shah, a descendant of Seljuk, there was a disputed succession and consequently weakness in the Turkish Empire, so that these people, who had embraced Mohammedanism and spread from Samarcand to Nicæa, were open to attack.

The honour of preaching the First Crusade must be divided between Peter the Hermit and Urban II. Peter was born at Amiens, and before he went on pilgrimage had been a soldier. He returned from Jerusalem burning with zeal for the recovery of the Holy City, and, with the customary wisdom of the Papacy, was despatched to preach. It is in this work that he is familiar to us, barefooted, mounted on an ass, and carrying a huge wooden cross. Urban was in a difficult position; he was troubled by a rival Pope, Clement III., and had to reprove the King of France while quarrelling with the Emperor. However, in the spring of 1095 a council was called at Piacenza, where the envoys of Alexius appealed for help, and then, in the autumn, came the famous Council of Clermont. Men's minds had already been stirred by the preaching of Peter, so we can well understand the enthusiasm aroused by Urban's eloquent peroration, "They who die will enter the mansions of heaven, while the living shall behold the sepulchre of their Lord." "It is the will of God," shouted the people, "it is the will of God;" and Urban replied, "It is in truth His will; and let these words be your war-cry when you unsheathe your swords against the enemy." Urban was invited to go but refused, sending Aymer, Bishop of Puy, as his legate. The concluding words of the Pope's speech explain the bitterness of the wars thus begun. Christians and Saracens alike felt sure of entering into Paradise if they fell in battle, while with regard to the survivors, as Scott's Templar bluntly put it, "A man that has slain three hundred Saracens need not reckon up every little failing like a village girl at her first confession upon Good Friday's eve."

No kings went on this Crusade, for very evident reasons. It was supported by nobles, and chiefly by the nobility of France, if we may give that name to princes who were practically independent. The chief of these were Raymond, Count of Toulouse, the oldest of the crusading chieftains; the ill-fated Robert of Normandy; Godfrey of Bouillon, Duke of Lorraine, son of that Eustace of Boulogne who caused such trouble in England during the reign of Edward the Confessor; Baldwin and Eustace, brothers of Godfrey; Hugh, Count of Vermandois, brother of Philip of France; Robert of Flanders, and Stephen, Count of Blois, son-in-law of the Conqueror.

But before the Crusade proper started a huge rabble marched off, too impatient to wait till the leaders had completed their preparations. These marched in four great bodies under Peter the Hermit, Walter the Penniless, Emico of Leiningen, and other leaders, and apparently numbered in all 300,000. They showed their zeal by slaughtering Jews, and, as they had no commissariat, plundered as they went. Many thousands of them were killed in retaliation as they passed through Hungary, so that a mere remnant reached Constantinople. These crossed the Bosphorus only to be destroyed by the Turks at Nicæa.

Like this mob, the crusading armies took various routes, but all went by land. The art of seamanship appears to have declined to such an extent that none thought of reaching Palestine by sea. Godfrey marched through Hungary and then by Belgrade and Philippopolis to Constantinople, where he spent the winter of 1096–97. Raymond went through Lombardy and then followed the coast through Dalmatia, suffering terrible hardships, till he reached Durazzo. Robert of Normandy, the last to start, journeyed through Rome to Barri, where he wintered; then in the spring, he crossed to Durazzo and proceeded to Constantinople. Hugh was the first to set out, but was taken prisoner at Durazzo, and detained by Alexius till the other Crusaders arrived at Constantinople. At last, in 1097, all, with the exception of Raymond, having sworn fealty to Alexius, they crossed the Bosphorus, much to the relief of the Emperor, who began to think the remedy worse than the disease.

Their first exploit was the capture of Nicæa, which fell at the end of June. This was followed three days later by a great victory over the Turks, when Robert of Normandy did deeds as great as those of his father at Hastings. The Crusaders then marched on to Iconium and Heraclea, and in October 1097 reached Antioch on the Orontes—a strong city which had been in the hands of the Turks since 1084. During the siege the Christians displayed their usual improvidence. The harvest was wasted, so that when Christmas came there was great want. In the spring of 1098, so great were the sufferings of the Crusaders that there were many desertions, and, when the city was taken, the Christians were themselves besieged by a great host under Corbogha, and their sufferings were worse than ever. Stephen of Blois returned home, and on his way met Alexius with a great force, whom he persuaded to turn back.

But the supernatural came to the aid of the Christians. Peter Bartholomew, chaplain of Raymond of Toulouse, announced that he had been told in a vision that in a certain church was buried the head of the spear that had pierced Christ's side. This would ensure victory. For a whole day they dug in vain. Towards the evening the priest himself went down alone into the pit, and, after a time, found the spear-head. Next morning the Crusaders marched out in twelve divisions against the foe, and were victorious. In the column where the Holy Lance was carried, not a man was hurt, we are told, save one who strayed from the ranks!

At last, marching by Emesa, and then along the coast from Tripoli to Jaffa, in June 1099 they reached Jerusalem, now in the hands of the Egyptian caliph. Great hardships were suffered on account of want of water, but in July the city fell. Thousands were massacred, and the Jews were burnt alive in their synagogues. Next day these strange men went, barefooted, to the Church of the Holy Sepulchre to give thanks, while, on the following day, there was another butchery. The last exploit of this Crusade was the defeat of a great Egyptian army at Ascalon, where Robert of Normandy again distinguished himself.

Thus the First Crusade was highly successful. The Holy Land was recovered and the Turks were driven back. Several states were set up. Godfrey ruled at Jerusalem, though he would not take the title of king, Baldwin at Edessa, Raymond at Tripoli, and Bohemond at Antioch. These three latter states were in some degree dependencies of Jerusalem. The weakness of the country was in the great length of frontier and in the small numbers of its defenders. Edessa was quite an outpost state in the north-east, and it was the capture of the city of Edessa in 1144 by the Sultan of Aleppo which led to the Second Crusade, concerning which very little need be said. It was preached by the famous Bernard of Clairvaux, and led by Louis VII. of France and the Emperor Conrad. Louis went because he had accidentally set fire to a church and burnt 1300

people, while Conrad was at last terrified into going by a sermon preached by Bernard setting forth the terrors of the Judgment. To Bernard's honour be it said that he allowed no massacre of the Jews. Many thieves and ruffians joined the army; these were looked upon as a mark of divine approval, but later they were regarded as the cause of failure. Conrad marched from Ratisbon and crossed from Constantinople, but met with disaster and returned to Nicæa, where he was joined by Louis. They journeyed to Antioch, and it was decided to attack Damascus. But the capture of this important city was prevented by the jealousy and cupidity of the Templars. Influenced by these motives, they persuaded the chiefs to move from the gardens to the south-west of the city, where, they said, the fortifications were weaker. But from the fresh position the capture of the city was hopeless on account of the absence of supplies, and the enterprise was given up. Tradition says that the gold received by the Templars as the price of their treachery turned to copper. When the Crusaders returned to Europe in 1149 there was a great outcry, but the thought of the bliss of those who had fallen stilled this.

So far the Christians had been helped by the dissensions among their opponents. There had been a Caliph at Cairo who did not acknowledge the Caliph of Bagdad. But these dissensions were healed by the great Saladin. In 1171 he restored the authority of the Caliph of Bagdad in Egypt. He himself was only the lieutenant of the Sultan of Aleppo, Noureddin, but, fortunately for Saladin, in 1174 Noureddin died on his way to Egypt. Thus there was union among the Saracens; and at this time there were increased dissensions among the Christians. In 1174 Baldwin IV. became King of Jerusalem, at the age of thirteen; but even then he was a leper, and there soon arose quarrels as to who was to reign for him. These were settled by crowning his nephew as Baldwin V., but this coronation was followed by quarrels for the regency. Baldwin IV. died in 1185, and his nephew in 1186, and then came disputes about the succession. Saladin had already met with success in both Syria and Palestine, but a truce had been arranged. Now, in defiance of this truce, and at this very time of internal weakness, Reginald of Châtillon attacked a Saracen caravan. Reginald was Lord of Kerak, a strong fortress east of the Dead Sea, on the caravan route between Syria and Egypt. Saladin at once prepared for war. His success was rapid. In July 1187 came the defeat of the Christians at Tiberias, and in October Jerusalem fell. Tyre was then the only great city remaining in Christian hands.

The news of the fall of Jerusalem was the immediate cause of the Third Crusade. Envoys had previously visited Europe, and, though they had not met with the success for which they had hoped, yet Henry II. had sent out large sums of money. Now Henry, his enemy Philip, and his son Richard all took the cross. Henry died during a fresh quarrel with Philip, and the leaders of the Third Crusade were Richard Cœur-de-Lion and Philip Augustus. But there was a third great sovereign who took the cross. This was the Emperor, Frederick Barbarossa. He started from Ratisbon in May 1189, and crossed the Bosphorus in the following March, but was drowned in one of the rivers of Asia Minor. A small part of his forces reached Acre in the autumn of 1190.

With the doings of Richard, Philip, and Leopold of Austria we are familiar from text-books of English history and the pages of *The Talisman*. Meeting at Vezelai, the two sovereigns travelled to Marseilles, and proceeded to Sicily, where their quarrels began. When they reached Acre they took opposite sides in the dispute as to the title—for it was nothing more—of King of Jerusalem. Baldwin IV. had had two sisters. The elder, Sibylla, had married Guy of Lusignan, while the younger, Isabella, was the wife of Conrad of Montferrat. As Sibylla was dead, Conrad had a plausible claim. Guy had begun the siege of Acre: Conrad had defended Tyre. It was quite in accordance with crusading traditions to quarrel over this matter rather than conquer the Holy Land. Richard supported Guy, while Philip took up the cause of Conrad.

Acre fell in July 1191, and then, Philip having gone home, Richard led the Crusaders southward past Cæsarea to Arsouf, where a great victory was gained over Saladin, September 7. Thence they proceeded to Jaffa, the walls of which were repaired, and then turned towards Jerusalem. When between Ramleh and the Holy City they were forced by dissensions to retire, and fell back upon Ascalon, which was reached at the end of the following January. Saladin had demolished the fortifications, so the Crusaders had more building to do. Here the dispute as to the kingship of Jerusalem was settled. Conrad became king, but soon after was murdered, and the blame was laid on Richard. A candidate acceptable to all was then found in Henry of Champagne, who married Conrad's widow, Guy receiving Cyprus as a solatium.

In May a fresh attempt was made on Jerusalem. After capturing Darum, on the coast south of Ascalon, the Crusaders marched to within a few miles of the Holy City, but again fell back. Richard and Saladin were both anxious for peace, and a truce for three years was made, the Christians to hold the country between Jaffa and Tyre, and to have free access to Jerusalem. Thus the Third Crusade had failed, though not so ignominiously as the Second.

When, in 1193, Saladin died, an attempt was made by Celestine III. to stir up a fresh Crusade. He met with no response in France or England for very obvious reasons, but the Emperor Henry VI. started off, ostensibly for the Holy Land, really to prosecute his designs on Sicily. But many of Henry's soldiers reached Palestine. The arrival of the first contingent at Acre in 1197 led to a renewal of the war, but Saphadin, Saladin's brother, captured Jaffa. When the second body arrived, Amalric of Lusignan, Isabella's fourth husband, who had succeeded Henry of Champagne as King of Jerusalem, defeated Saphadin, and took Jaffa and Sidon. Yet a third body of Germans arrived, and the siege of Toron, south-east of Tyre, was begun. But disputes among the Crusaders, and news of the death of Henry, caused the abandonment of the enterprise and the return of the Crusaders. Jaffa soon afterwards fell again into Saracen hands.

In the following year Innocent III. was elected Pope. Much disappointed at the failure of the year before, he tried to rouse Europe to a renewal of the Holy War. As in the First Crusade, there was a great preacher, Peter's place being filled by Fulk of Neuilly. As in the First Crusade also, there were many French nobles —Theobald of Champagne, Simon de Montfort, Baldwin of Flanders, and Louis of Blois. Before a start was made in 1202 Fulk died, partly of grief at the long delay. It was decided to avoid the dangers of the long march through Hungary and Asia Minor by following

the example of Richard and Philip Augustus, and going by sea. Envoys were therefore sent to Dandolo, the Doge of Venice, to make an agreement as to the hire of a great fleet. The price asked by Dandolo was 85,000 marks. But the Crusaders had only 51,000, and Dandolo agreed to forego the rest if the Crusaders would assist him to conquer Zara, on the coast of Dalmatia. Zara was accordingly taken in November 1202, in spite of Innocent's prohibition, and there the winter was spent. When spring came a further modification of plans was made. The Eastern Emperor, Isaac, had been deposed and blinded by his brother. It was therefore decided to place Isaac's son, Alexius, on the throne of Constantinople. This conquest was effected, and victory was signalised by plunder and debauchery. But before long Alexius turned against his friends and was himself deposed, Baldwin of Flanders being made Emperor; while the Patriarch of Constantinople was displaced by Morosini, a Venetian. Thus for nearly sixty years Western princes reigned at Constantinople, and the schism between East and West was for that length of time closed.

A few of the princes had not come with Dandolo. These had reached Palestine in 1203 under Reginald of Dampierre. Saphadin gave Nazareth into their hands as the price of peace.

What is usually called the Sixth Crusade was a most remarkable expedition, inasmuch as it was led by a sovereign who was under excommunication. This was the great Frederick II., grandson of Barbarossa. In 1214, in answer to the appeals of Innocent, he took the vow of Crusade. At last he promised to go in August 1221. In 1223 he met Pope Honorius, and promised to start in 1225. In that year, having married Isabella, granddaughter of Conrad of Montferrat, he took the title of King of Jerusalem, and vowed to go in 1227. Meanwhile two expeditions had gone, one under Andrew of Hungary and the other under French and English nobles, neither of which had accomplished anything. In 1227 Gregory IX. became Pope at the age of eighty, and when Frederick at last started from Brindisi and put back again, as he said, owing to sickness, Gregory excommunicated him. Next year all places where Frederick should go were placed under interdict—"a Kaiser *not* gone on the Crusade, as he had vowed; Kaiser at last suspected of free-thinking even."[1] In spite of this the Emperor set out and reached Acre. Here his only friends were the Teutonic Knights, for the other military orders opposed him on account of the Pope's attitude. There was no fighting, but Frederick concluded what we may call a very satisfactory treaty; the Christians were to hold Jaffa, Nazareth, and Bethlehem, and were to be allowed to enter the Mosque of Omar for prayer. In March 1229 Frederick visited Jerusalem, where, in the Church of the Holy Sepulchre, he crowned himself, as none of the clergy would perform the ceremony. Soon after he returned from Acre. The Saracens thought highly of him; but Gregory was very angry at the attempt to reconcile Christ and Belial, and Frederick remained under excommunication.

The peace arranged by Frederick was not kept. Christians were slain on the road between Acre and Jerusalem, and in 1239 two bands of Crusaders started, one under the Count of Montfort, Earl Simon's brother, and the second under Richard of Cornwall, brother of Henry III. The French did nothing, but thanks to the help of the English band and to the quarrels between Syria and Egypt, the Christians secured possession of almost all Palestine west of the Jordan. But in 1242 came a fearful disaster. The Korasmians, driven from their homes by Genghis Khan, invaded the country and took Jerusalem, massacring 30,000 people. Saracens and Franks united against them, but in vain; hardly any of the knights of the three great Orders escaped from the battle which followed.

The next effort on behalf of Christendom was made by the saintly Louis IX. of France, a sovereign of wonderful piety and of a remarkably blameless life. His seneschal was with him constantly for twenty-two years, and never once heard him use any profane language; and this was in the thirteenth century! He was almost the only Crusading chief who did not, at a time of success, give way to all kinds of self-indulgence. At the Council of Lyons, famous in English history on account of the complaints made of the rapacity of the Church, the need of a great effort to save the Holy Land was urged. Pope Honorius tried to induce Henry III. to go, but in vain. But in August 1248 Louis started and reached Cyprus. Here the winter was spent. In 1249 they moved on, and, deciding to attack Palestine through Egypt, sailed to Damietta, which they took. In November they marched towards Cairo, but on the way were hopelessly defeated, the Count of Artois being killed and 10,000 men captured. On the retreat towards Damietta Louis himself was taken prisoner. Peace was secured by the surrender of their one conquest and the payment of a huge ransom. After that the enterprise was over. Louis made a pilgrimage to Nazareth and received permission to visit Jerusalem, but refused to avail himself of the offer. In 1254 he returned home, the intervening years having been spent in strengthening the fortifications of the seaport towns still in Christian hands.

It is very plain that the chief cause of the failure of these enterprises was jealousy. The native nobles were jealous of newcomers, the Hospitallers of the Templars, and Crusaders of one nation of those of another. Even in times of great danger this feeling overcame all others. In 1259 there was a pitched battle between Hospitallers and Templars, and in 1260 a sea-fight off Acre between Genoese and Venetians. It is therefore not surprising that between 1263 and 1268 Nazareth, Arsouf, Safed, Jaffa, and Antioch all fell. These disasters led to what proved to be the last Crusade. Again Louis went forth, accompanied by the kings of Navarre and Aragon, taking with him 60,000 men. They turned off to Tunis, hoping that their appearance would induce its ruler to declare himself a Christian. There Louis died of dysentery. In October 1270, Edward, son of our Henry III., arrived with his forces at Tunis. The winter was spent in Sicily, and thence Edward led his own forces to Acre, the French troops returning home. By Edward's arrival the fall of Acre was postponed, but very little was done. A few raids were made, but many of the English died from heat and intemperance, and, peace having been made for ten years, Edward started for home, August 1272, whither he had been summoned by his father.

All that had been gained was ten years' respite for Acre. This town and Tripoli were now the only remnants of the states founded by Godfrey of Bouillon and his fellows. Acre was particularly important on account

[1] Carlyle.

of the large trade of which it was the centre. It was now crowded, for many had taken refuge there. In 1289 Tripoli fell; and when, in 1291, the Sultan Khalil appeared before Acre, the Crusaders showed one of their chief virtues—courage, for his terms were rejected. As the siege went on some fled by sea, but many resisted to the last; and when, after two months, Acre fell, 60,000 people lost their lives, or became slaves.

The Holy Land was lost. Though it was not acknowledged, the last Crusade had taken place. Gregory X. and Nicholas IV. tried in vain to stir men to a fresh effort. Edward III. promised to John XXII. that he would set out, but he did not keep his word. Pilgrims continued to go to Jerusalem, and Caxton printed a guide-book for their use; but almost the last sign of the crusading spirit is seen in the dying utterance of Henry V., "Good Lord, Thou knowest that mine intent hath been to build again the walls of Jerusalem." The Crusaders were not without their good points. They were brave, they could endure hardship, and always chose death rather than renounce their faith. But these qualities were nullified by their jealousy, their discord, their treachery, and their cupidity. Natural difficulties of climate and situation rendered the task of holding the Holy Land a hard one; these defects in the Crusaders and the Military Orders made it impossible.

But though the Crusaders failed in their first object, yet, as was pointed out, they succeeded in driving back the Turks. They had also most important commercial results. The old route to the East had been through south Russia. These wars opened the Mediterranean route. The first Crusaders travelled overland to Palestine; but maritime skill was encouraged, and other bands went across the Mediterranean, while some even sailed across the Bay of Biscay and through the Straits of Gibraltar. The stream of pilgrims had occasioned an Easter Fair at Jerusalem in very early times; the Crusades led to the growth of Acre, Venice, Pisa, and Genoa, and helped on the prosperity of the Hanse towns. Various products were brought from the East, such as pepper, spices, maize, and sugar; and various processes, such as working in glass and metals.

It is doubtful whether the Crusades did good or harm to the Papacy. Undoubtedly these wars increased the Pope's power. His legates were everywhere, and wealth and lands accumulated in Church hands. But these matters all became causes of complaint, while it was against the practice of granting Indulgences that Martin Luther first lifted up his voice, and the contact through war and commerce with people of another creed led to toleration and independence of thought.

The greatest share in the Crusades was taken by France. England was struggling with the Normans and Germany with the Pope; while, with regard to Spain, "the Crusades had been merely an episode in the history of other nations. The existence of Spain had been one long Crusade."[1] That is why to the Saracens all Christians were "Franks"; and, what is far more important, that is why the use of the French tongue became so universal. Another important result followed in France in the increase of royal power consequent upon the absence abroad of many great nobles. This result was felt in all Christian Europe, but in France most of all.

[1] Macaulay.

NOTES ON AN EXPERIMENTAL COURSE OF LESSONS ON AIR AND WATER.

BY EDWARD J. RUSSELL, D.SC. (LOND.),

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(*Continued from p.* 135.)

The Relation of Plants to Water.

THE amount of water contained in a plant is very great.

Experiment 115.—Take up a growing plant of any kind, but of some convenient size, rapidly wash away soil particles from the roots, and weigh. Put into an evaporating basin, and heat in an oven or on top of the stove, taking care that the plant does not char. When all the water has been driven off, weigh again: it will usually be found that about $\frac{4}{5}$ of the original weight is lost. Most plants contain 80 to 90 per cent. of water.

Water is just as essential to plants as to animals, and they are much more sensitive to fluctuations of water supply than to variations in the amount of air or food given them.

Experiment 116.—Select three plants in pots as nearly uniform as you can. Water one to excess and keep it permanently saturated, let the second alone altogether and add no water, keep the third sufficiently supplied, allowing the soil to be neither too wet nor too dry. Note the effects: the first may be killed outright or it may simply manage to survive, the second droops or "wilts," whilst the third makes normal growth.

The roots are the main organs through which the plant obtains its supply of water; a little may enter through the leaf, but probably not much.

The Transpiration Stream.

Plants take in water through the roots, but they give it off in large quantities.

Experiment 117.—Place a bell jar or large wide-mouthed bottle over a growing plant, and notice the amount of water deposited on the side.

Experiment 118.—Cut pieces of tinfoil to cover as completely as possible the top of a glazed pot in which a plant is growing. Water and weigh. Take daily readings, and note how the result is affected by temperature, sunshine, &c.

The object of the tinfoil is to prevent evaporation from the soil, and the pot must be glazed for the same reason. I always use a jam jar.

It is now necessary to examine a little more closely this giving off of water.

Experiment 119.—A rough idea of the quantity of water entering a plant may be obtained by fitting a U-tube with corks, filling with water, through one cork fixing a narrow-bore glass tube horizontally, and through the other a leafy shoot cut from a healthy plant. Seal with paraffin wax to make the joint air-tight. Paste a paper scale on the horizontal tube, and take readings of the position of the water column, noting how its movement is affected by darkness, sunlight, &c.

Experiment 120.—Weigh before and after the experiment; an actual loss of weight occurs because the water

is really given off from the plant and not merely taken into its substance.

The following very pretty experiment illustrates the process as well as any:—

Experiment 121.—Fit a good cork into a test tube, cut the cork in two from top to bottom, and by aid of the two pieces fix a long straight leaf, as of narcissus or grass, into the tube without severing from the plant. In the course of a day or so a considerable amount of water collects.

We learn from these experiments that a large amount of water enters the plants through the roots, and passes out through the leaves or stems, producing a constant stream through the whole plant. The process is known as transpiration, and the stream of water is called the transpiration current. It goes on day and night, but is most vigorous in sunlight. The evaporation of the water cools the plant, and one great advantage of transpiration is that it prevents the temperature rising too high.

This apparatus of Experiment 119 can also be used to ascertain whether the leaves or the stems of plants are mainly involved during the process.

Experiment 122.—Having found the rate of movement of the water in the tube, pluck off the leaves and note the result. It will be found that transpiration practically ceases.

The amount of water given off depends also on the area of the leaf.

Experiment 123.—Repeat Experiment 119 with a large-leaved plant and also with one possessing a small leaf area; observe the different rates of transpiration.

The teacher should connect this observation with the distribution of large and small leaved plants in nature. In dry places, where the supply of water is very limited, only those with small leaves can survive, and the smaller the leaf the better the chance of surviving. Thus on dry sandy places gorse and broom may be looked for; on dry chalk land the grasses are found to have very small leaves. Desert plants are so arranged that they only require very little water. Where, however, a larger water supply is available, the larger-leaved plants have the advantage, and accordingly we find in moist places broad-leaved grasses and plants like the burdock, &c. It should be observed that these results are obtained only when fairly pure water is supplied.

Experiment 124.—Take three shoots, as nearly equal as you can find, of some plant, like dog's mercury, that transpires a fairly large amount of water. Place one in water, support another in an empty glass, and put the third into a strong sugar solution. This last one wilts in a very short time, giving out much before the second. You can show that the effect is not a poisoning one by transferring to pure water, when rapid recovery takes place.

This phenomenon is a consequence of the general law that water tends to pass from a dilute to a more concentrated solution. So long as the solution in the plant (the cell sap) is more concentrated than the solution outside, water will enter and the plant continues normal; directly the solution outside is more concentrated than that in the plant, water passes outwards and the plant wilts.

Plants growing in marshy places, where the water is stagnant and may contain a considerable amount of dissolved matter, frequently have the small leaf area adapted to small water requirements.

It is interesting to note that only one side of the leaf actively transpires water.

Experiment 125.—Dissolve a little cobalt chloride in water, pour the solution on to some pieces of blotting-paper about three inches square, and dry. These papers form admirable tests for the presence of water vapour; when dry they are blue, but a small quantity of moisture turns them pink. Place one of these papers on each of two dry pieces of glass, then at once enclose a leaf between them. The paper on the under side of the leaf rapidly turns pink, that on the upper side remains blue.

Use of Water in the Plant.

As water forms 80 to 90 per cent. of the plant substance, it must be regarded as an essential plant food.

It also helps to keep the plant rigid. We have seen that without water the plant wilts, becoming quite flaccid; it can easily be shown that if the plant is placed in water, and especially in warm water, it quickly regains its original rigidity. The following experiment is at once simple and striking:—

Experiment 126.—Bend a piece of glass tubing into the shape of a J, leaving one leg much longer than the other. Fix a wilted shoot in the shorter leg, seal in with paraffin, and tie the cork down so that it can withstand pressure; fill the shorter limb with water, and pour mercury down the longer. The water thus forced into the plant causes it to stand up almost at once.

Dog's mercury and Jerusalem artichoke both answer very well.

The stream of water passing through the plant also helps to carry forward dissolved matter, and so assists in moving the food absorbed by the roots right up through the whole body of the plant.

Experiment 127.—Dip a crocus flower or elder leaf in red ink mixed with water; leave in sunlight for a few hours. In a short time the petals or leaves have become marked with red.

It is essential that the substance should be dissolved, and not merely mixed with the water. If carmine red (an insoluble body) is used in the above experiment, the shoot shows no sign of colour.

We may sum up our observations as follows:—

1. A steady stream of water is continuously passing through the plant, entering at the root and going out at the leaves.

2. The under side of the leaf is chiefly involved.

3. During sunlight the process is considerably hastened; an obvious advantage is that the plant is kept cool and prevented from being heated to what might easily be a fatal temperature.

4. If the supply of water is insufficient, or if the water does not enter sufficiently quickly, the plant becomes flaccid, and is said to wilt. The original rigidity quickly returns when water is forced into the plant, and more slowly when it enters naturally.

5. If the water contains much dissolved matter it does not readily enter the plant.

6. These observations help us to understand the distribution of small and large leaved plants in nature.

The Practical
Infant-School Teacher.

SCHOOL GARDENING FOR LITTLE CHILDREN.

BY LUCY R. LATTER.

PART IX.

"Another round, and higher,
Ye shall climb on the heavenly stair."

IN this article I reproduce the plan of work prepared for my own school in connection with the loftiest subject in the physical world—the Sun—as the last example in this series of articles illustrative of the relation of the school garden to the rest of the school curriculum.

†II. B.—The Standpoint from which the Subject was Considered with the Children.

"Let there be lights in the firmament of the heaven to divide the day from the night; and let them be for signs, and for seasons, and for days, and for years."

"O glorious orb! O golden sun!
I would I had an angel's ken,
Your deepest secrets to divine,
And read your mysteries to men."

The sun was chosen as a subject for special consideration during the months of April, May, and June one year in order that the children might be helped to realise how absolutely all living things depend upon the sun for their physical needs and welfare. The earth is lit up by its beams and warmed by its heat. But this is not all. The sun builds up the vegetable world, and so clothes the earth with verdure and beauty, and provides the means of sustenance for the creatures of the animal world, even man himself. All the work of the world is done by the sun, and "man himself, prince or peasant, is but a little engine which *directs* merely the energy supplied by the sun."

But there is a higher thought. Everything in Nature has a spiritual prototype. In leading the children humbly and reverently into the glorious realms of Nature we are helping them to realise something of the perfect order and beauty of the spiritual or world of cause, as well as of the physical or world of effect, and also the great love and wisdom of the Divine Planner whose tender mercies are over all His works. Says Proctor, one of our astronomers:—

"The sun is an emblem of the Almighty in being the source whence all that lives upon the earth derives support. Our very existence depends on the beneficent supply of light and heat poured out continually upon the earth by the great central orb of the planetary scheme. . . . Yet again, the sun is an emblem of the Almighty in the manner in which He bestows benefits upon us and is forgotten. Day after day we enjoy the sun's light and heat; clouds may conceal him from our view, much as troubles may cause us to forget God; and the heat he pours out may seem sometimes insufficient or excessive, even as in our ignorance we are dissatisfied with the blessings bestowed by the Almighty.

"Yet these very clouds are among the good works we owe to the sun—they bring the rain which 'drops fatness upon the earth'; and without the changes of the season there would be neither the time of harvest nor the time of vintage. The cold of winter and the heat of summer, at which we often repine as excessive, are as necessary for our wants as the cool breeze and the genial warmth of spring and autumn.

"We commonly forget also, that the sun besides sustaining us by his light-giving and heat-supplying power, keeps us always near to him by that mighty force of attraction which his vast bulk enables him to exert."

III.—Plan of Work with the Children.

What a beautiful bright morning! Everybody seems glad and cheerful and every place full of happy light! What can it be that is making us all so glad? Yes, the sun is shedding its glory over the earth. Who has noticed the sun this morning? Where did it seem to be when the children came into school this morning? What did it look like? Although the sun is very, very far away from us, its brightness is so great that we cannot look at it longer than a second or two.

The children go out into the playground and observe the position of the sun in the sky at given times. They observe its shape and brightness through a piece of smoked glass. The first class children refer to their sun-chart for the progress of the sun in the sky during the previous months. The record is continued.

Sunbeams.

The sun's light comes streaming down as merry, busy little sunbeams. They have always a great deal of work to do on the earth. They not only make every place bright and cheerful, but also nice and warm. Without the light and heat of the sun it would be

† I. = Experience with the real thing.
II. A. = Notes or information for the Teacher.
See Article IV. in the *Practical Teacher* for November 1904.

bitterly cold and dark. No plants and no animals could live.

The children recall some of the dark days of the preceding winter when the sun shone but little. How some days the ground was covered with snow and ice, and then the sun sent its warm beams to melt them. Now the warm sunbeams have been kissing the sleeping flowers and all the tree-buds, and bidding them wake up to help make the earth beautiful again. The insects too are being wakened up from their long winter sleep, and the birds called back to cheer us with their songs once more.

Let the children hold one hand in the sunlight. They find that it gets warmer than the hand which is not so held. Let them touch an object (a window-sill or the railing of the "verandah") on which the sun is shining. Groups of children go to the garden, and also to Greenwich Park, to see what flowers have been kissed by the sunbeams. They find crocuses holding up their beautiful cups to catch the bright light of the sun, later golden daffodils rejoicing in the glorious sunlight, and hyacinths of almost every hue flinging their soft and delicate perfume from their dainty bells, and all around trees and bushes bursting into living green. Indoors the children find the "sticky" and other buds bursting open more and more each day, and most of their bulbous plants, not right in bloom, in full bud ready to reveal the rich flowers within at Apollo's first radiant smile.

The Path of the Sunbeam, and what may be seen in it.

The sun always sends its beams down to the earth by a short way. They come straight down, but they cannot go through a stone wall or a wooden door. Can the children name some of the things the little sunbeams can get through? As the little sunbeams come journeying down to us something else seems to come with them. Little specks of dust, which are moving about all the while although we cannot always see them, even when the sun is shining brightly. Why?

Again, the dust specks help to make the pretty colours which we see in the sky at certain times of the day—at sunrise—at sunset. * How?

The windows in the teacher's room are all darkened (with brown paper). A little hole is left in the material covering one of the windows. Groups of children go up to the room and observe the effect.†

** The children are enlisted to watch the sky and note the pretty colours they see there at sunset.*

Catching a Sunbeam.

What a sunbeam does when it meets a polished surface.

It forms a bright or light-picture somewhere of itself.

Sun-pictures, and how they are formed.

Individual children try to catch sunbeams coming into the room with a small piece of looking-glass. Other children find the light-picture formed thereby. A bowl of clear water is placed in the way of a sunbeam and the effect watched.

Poulsson's "Song of the Light Bird" may here be sung.

The children lay a leaf on a piece of sensitised paper under glass, and then expose it to the light. The parts of the paper not covered by the leaf change colour, so that when the glass and leaf are finally lifted the form of the latter remains.

** Individual children make a model of a small hand camera with a suitably shaped box, such as an ordinary cigar-box.*

The Colours in the Sunbeam.

What they tell grown-up people. How we can find out the colours in the sunbeam.

The Prism.

What it is, and what it does to the little sunbeam trying to pass through it.

The Rainbow.

What it is. Its beautiful form, its lovely colours. How and when it is formed. It is only seen when the sun is shining, but it never appears in the same part of the sky as the sun. Something always accompanies the rainbow.

*As on previous occasions, the windows in the teacher's room are darkened, and a little hole is left in the material covering one of the windows. Groups of children go up to the room to watch the effect of a sunbeam or ray of light passing through a prism on to a screen of white paper, on to the floor, a blackboard, the children themselves. They notice the colours thrown on the screen, the floor, the blackboard, and themselves. * The work of the dust specks is recalled. The younger children blow soap-bubbles in the sunlight and notice the pretty colours in them.*

The Sun as a Giver of Health.

Most plants soon become sick and die if they are shut away from the light of the sun. Most animals, too, need light. We are all happier and stronger when we shut ourselves as little as possible from the light of Heaven. The little children in dark gloomy streets are never so happy and strong as children living in bright sunshiny places. Many of the little birds fly away to a warmer, brighter country directly winter comes.

The children recall the appearance of the indoor bulbous plants when first taken out of the dark just after Christmas.

They also recall the putting of the school doves in a sunny window, or right out of doors on a warm bright day.

The children look at the plants in school (the daffodils, narcissi, tulips, etc.). They notice that they all turn their heads towards the window. They notice also that most of the plants farthest from the windows seem less strong and happy. They call to mind how the sunflowers in the garden always kept their faces turned towards the glorious sun.

The Sun as a Painter.

The sun helps to make the leaves of plants green; it also helps to make the colour of the flowers and fruits.

The children recall the blanched appearance of the upward shoots of their indoor bulbous plants when first taken out of the dark, and how they gradually became green when kept in the light. They recall the

* Points with an asterisk against them are for the older children.

† When this work was actually taken, the children were much amused by the appearance of the shadows of children playing in the playground on the ceiling of the room.

gradual exquisite "painting" of the hyacinth flowers. The children go in groups to the garden and notice the bright appearance of the plants when the sun is shining. They also notice the beautiful colours in the sky. Groups of children go to Greenwich Park and notice the effect of the sunlight on the trees, on the grass, etc.

Sometimes the sun takes the colour away from things. A picture is lifted down from the wall. The children notice the difference between the colour of the space previously occupied by the picture and the rest of the wall. They find the flowers on some of their hats have lost their pretty colour.

The Sun's Drying and Burning Powers.

Sometimes the sun dries and parches the ground, and even burns the grass and other things. The children's faces are often browned and burnt by the sun in the summer time.

*The use of the burning-glass.

Individual children test the burning power of the sun with pieces of paper and a magnifying or burning-glass for the time being.†

A saucer of water is left out in the sunlight. The children find in a day or so that the water has all disappeared. A pot of earth is likewise left out in the sun. The children soon find that the sun has dried the earth all up.

(Note.—*The water in the saucer will in any case disappear, and the earth in the pot dry up in course of time, but they do so more quickly under the direct influence of sunlight. The children might be encouraged to notice which side of the playground (the sunny or the shady one) dries the quicker after a storm. They might also be encouraged to look at the plants in the south and in the north windows of the school, and see in which case the earth seems to get dry more quickly.*)

*Stored up Sunbeams.

The burning of the Christmas tree logs in school recalled, the pretty light then given out by them. Our beautiful fir tree was giving us back some of the little sunbeams which it had stored up during its life in the forest. In a similar manner long ago, the trees and ferns in big woods stored up all the sunbeams they could catch, and when they had finished their work as trees and ferns, they fell, or were blown down. Then they gradually got covered up and pressed closer and closer deep in the earth. Now when men dig down through the rocks they come upon these remains of the trees and ferns in the form of what we call coal.

Pieces of coal with impresses of ferns upon them are examined by the children.

*The Sun as a Guide to the Traveller.

Long ago people had to find out their way in the day-time by noticing the position of the sun in the sky. They noticed that the sun always rose in a particular place, and that it always set in a place opposite to where it seemed to rise. They watched the sun still more, and noticed that it seemed to go up to a certain place in the sky, and then gradually go down towards the place where it had always seemed to set. This helped the people to find their way generally. By-and-by they fixed upon the highest point in the sky which the sun seemed to reach, and determined from there other directions, and then they were able to find their way about still better in the daytime.

The Compass. The Weather-Vane.

Groups of children go out at twelve o'clock. They find out from the position of the sun in the sky the direction in which they are walking.

Individual children make a small compass, a small weather-vane, and use the same in the school and in the playground.

(*To be continued.*)

† A day or so after this work was actually taken with the children, a little boy brought to school a rough piece of wood on which his father had burnt his name with a burning-glass.

THE SHEPHERD'S DOG.

OLD Tom, the shepherd, has a dog,
A collie dog is he;
The best and cleverest of dogs
That you could ever see.

His master wouldn't part with him
For all his weight in gold;
He drives the sheep home every night,
And pens them in the fold.

And every morning, when it's light,
He takes them to the mead;
And all the day he stops by them,
And watches while they feed.

But if a silly sheep should try
To wander down the lane,
Tom's dog will rush away at once,
And drive it back again.

And when by chance a sheep is lost
Upon the distant wold,
The collie never rests until
It's safe within the fold.

He's clever, quick, and willing too,
And always bright and jolly;
I think some boys might try to be
Like old Tom's trusty collie.

E. S.

A book of exceptional interest, by the late Sir William Laird Clowes, entitled "Trafalgar Refought," is about to be published by Messrs. Thomas Nelson & Sons. Sir William Clowes projected and edited important naval publications, and was widely known as a special correspondent and brilliant writer on all questions relating to the Navy. In association with Alan H Burgoyne he has written a work which should prove to be *the* book of the year for boys, and for all interested in modern naval tactics. The authors imagine Trafalgar as it would be if refought under steam, and with the steel-clad ships, the tremendous weapons, and murderous possibilities of to-day. All the knowledge of two of the foremost naval experts has been concentrated on the book, which forms a story, the climax of which will be read with breathless interest. The book will be splendidly illustrated, tastefully bound, and issued at six shillings.

EDUCATION IN FOREIGN LANDS.

Denmark.—The Danish Parliament has lately passed an Act for dealing with neglected children or those who develop tendencies to crime. It lays down as a principle that the fact of a child being vagrant or criminal is sufficient proof that the parents have neglected their duty. It also proceeds on the assumption that such children are not to be saved by punishment, but by giving them the advantages of proper discipline and instruction. To carry out the intentions of the Act, parishes are entrusted with large powers. Each parish elects a Committee for the sole purpose of making the Act effective. In the larger parishes the Committee consists of seven members. The President must be a lawyer nominated by the Minister of Justice, and amongst the other members must be a medical man, a teacher, a minister of religion, and a lady. In the smaller parishes, where the Committee consists of five members, one at least must be a teacher. To the local bodies, which are subject to a higher Committee whose President is the Chief Inspector of all the institutions and homes for neglected children, the police hand over all children arrested for criminal acts. The Committee has power to summon before it the parents of the children and fine them. If the punishment thus inflicted proves to be ineffective, a guardian can be appointed, to whose directions the parents are bound to defer. The Committee has also power to order that after school hours the child shall go to a Children's Home instead of wandering about the street. In cases where it is deemed suitable, the child can be taken altogether from its miserable surroundings, and confided to the care of foster parents. In the worst cases the child can be sent to a Rescue Home. Of these there are many in Denmark, the greater number being under private management. The State is, however, contemplating the erection of two fresh Homes, one for fifty boys, and the other for thirty girls. These will to a large extent fulfil the purpose of our Reformatories. Children can be detained in them for three years beyond the time at which the obligation to attend school ceases. The working of the new law will be watched carefully by all who take an interest in the cause of the children.

Mecklenburg-Schwerin.—Although it is true that throughout Germany in general there is a belief in the necessity of education to an extent which does not prevail with us, there are some states where this belief is held in a lukewarm fashion, and where the teacher occupies a very inferior and subordinate position. Mecklenburg-Schwerin is a case in point. It contains a very large proportion of rural schools, the teachers of which are nominated by the landowners, who can make their positions very unpleasant if they manifest any independence. When to this is added the subjection to the local pastor, a teacher who wishes to think and act for himself is likely to find that the Grand Duchy is not a suitable sphere of labour for him. The *Frankfurter Zeitung*, in the course of a weighty article on the backwardness of the Grand Duchy in education, cites the incident of a squire who ordered the teacher to allow certain children to be absent from school for the purpose of beating for game. The teacher refused to do so, on the ground that it was illegal, whereupon the squire retaliated by attacking that part of the teacher's organism which forms the subject of a well-known play. For the steward of the estate, the teacher, and other officials, dinner was provided every day. The teacher was told not to show his face at dinner again, and for some days he went dinnerless until the great man relented. The question of the subjection of the teacher to the local clergy is becoming a burning one amongst German teachers, and perhaps for this reason the Government of the Grand Duchy is determined teachers shall not forget that the parson is one of their masters. In a circular lately issued it informs teachers that *they need no permission to go away during holidays, but they must before doing so inform the local pastor of their intention.* There are not wanting, however, among the Mecklenburg teachers those who have the courage to brave the consequences of resisting tyranny. Herr Rehm, of Pampow, by a bold appeal to the laws of the Duchy, has successfully resisted the efforts of the local authorities to remove him. Commenting on this, a pastor who is noted for his attacks on teachers writes to the press pointing out that the teacher's name is a word which occurs in the Hebrew of the Old Testament, and which is translated by Luther as a "wild buffalo." The reverend gentleman further goes on to deplore the fact that Herr Rehm has been able to utilise what he describes as "an unfortunate omission of a temporary nature in one of the statutes of Mecklenburg."

Austria.—The formation of a strong professional organisation for teachers, embracing teachers of every shade of religious opinion, appears to be near realisation in the German-speaking parts of the Austrian Empire. Fired by the example of the German Teachers' Union, with its membership of 104,000, some of the more energetic of the Austrian teachers have for years been advocating the formation of a Union on a similarly broad basis. Up to the present, denominational organisations have stood in the way of an all-embracing society, but by the confession of their supporters these societies have without exception been failures. The new Union has a membership of 18,000, and all the omens point to its success.

Japan.—There has just been published in Leipsic a volume on Japan, written by Japanese themselves. Among the collaborators are men like Ito, Oyama, and Okuma, whose names are now household words. One

chapter of the book deals with public instruction, and from it we learn that in 1871 a Minister of Public Instruction was appointed, and two years later a law was passed organising education in all its grades. In the elementary schools instruction is gratuitous, and attendance is obligatory from the age of six up to the age of fourteen years. No religion is taught in them, but moral teaching, independent of religion, forms one of the obligatory subjects of instruction. The others are the Japanese language, arithmetic, and gymnastics. Drawing, singing, and manual work are optional subjects. In the secondary schools elementary science, history, drawing, agriculture, and English are taught. About 90 per cent. of the children of school age are taught in elementary schools, of which there are 28,000, with a roll of nearly 5,000,000 scholars. All the teachers are certificated. They are trained in one of the State normal schools. There are 54 of these, accommodating 12,000 teachers. After fifteen years' service, teachers have a right to a pension. Who after reading such figures as these can wonder at recent events?

United States.—The system of vertical writing, which made great headway in the States, appears to be losing popularity. Out of 25 States which adopted it 15 have gone back to sloping writing. It is argued that vertical writing is too slow, characterless, and easily imitated, and always liable to degenerate into writing with a left hand slope. One of the largest American business houses refuses to accept clerks who write a vertical hand. On the other hand, however, exactly one-half of the headmasters of schools in Chicago pronounce in favour of vertical writing, whilst the *American Journal of Education* pronounces in favour of legible writing, whether sloped or upright.

Russia.—In the rural schools of Russia examinations are very popular both with teachers and scholars. The teachers see in them an excellent incentive to emulation, and the children, despite the great distances many of them have to traverse, look upon the examination day as a festival. The success of the examination is, however, often marred by the fact of the teachers not being allowed to question. The inspector on whom that duty falls are often insufficiently acquainted with the schemes of work and the methods employed in the instruction.

FRENCH PRIZE COMPETITION.

RULES.

1. All translations should be **posted not later than October 8th, 1905**, and addressed:—PRIZE EDITOR, Office of the *Practical Teacher*, 35 and 36 Paternoster Row, London, E.C.
2. Competitors should cut out and send the Coupon which appears on the Back Wrapper page of the current number.
3. Competitors should write pseudonym only on MS. Prize-winner will be asked to send name and address for publication.
4. No competitor may take the prize offered more than once in three months.

A Prize of Half a Guinea is offered for the best rendering into English of the following extract:—

Du Girondin au Jacobin il y avait une différence, non fortuite, mais naturelle, innée différence d'espèce, haine instinctive, comme du loup au chien. Madame Roland, en particulier, par ses qualités brillantes et viriles, effarouchait Robespierre. Tous deux avaient ce qui semblerait pouvoir rapprocher les hommes, et qui, au contraire, crée entre eux les plus vives antipathies; *avoir un même défaut.* Sous l'héroïsme de l'une, sous la persévérance admirable de l'autre, il y avait un défaut commun, disons-le, un ridicule. Tous deux, ils écrivaient toujours, *ils étaient nés scribes.* Préoccuppé, on le verra, du style autant que des affaires, ils ont écrit la nuit, le jour, vivant, mourant; dans les plus terribles crises, et presque sous le couteau, la plume et le style furent pour eux une pensée obstinée. Vrais fils du dix-huitième siècle, du siècle éminemment littéraire, ils gardèrent ce caractère dans les tragédies d'un autre âge. Madame Roland, d'un cœur tranquille, écrit, soigne, caresse ses admirables portraits, pendant que les crieurs publics lui chantent sous les fenêtres, "La mort de la femme Roland!" Robespierre, la veille du 9 thermidor, entre la pensée de l'assassinat et celle de l'échafaud, arrondit sa période, moins soucieux de vivre, ce semble, que de rester bon écrivain. Comme politiques et gens de lettres, dès cette époque, ils s'aimaient peu. Robespierre, d'ailleurs, avait un sens trop juste, une trop parfaite entente de l'unité de vie nécessaire aux grands travailleurs, pour se rapprocher aisément de cette femme, de cette reine. Près de Madame Roland, qu'eût été la vie d'un ami? Ou l'obéissance, ou l'orage.

JULES MICHELET.

RESULT OF THE AUGUST COMPETITION.

The prize is awarded to "P.G.A." Will "P.G.A." kindly forward name and address for publication.

First Class.—Aschenbrödel, Eicarg, C.E.U., Carola, Caudebec, Carpe diem, Barberton, Mr. Micawber, Witenagemot, Shakspere, Vivienne, Enola, Radiobe, Frances Eugène, Bluette, Gertrude, Bâtonallié, Patricia, Bracebridge, Deacon, D.S.G., Ischomachos, Les fleuves, Gyp, Excalibur, Kitty Brewster, Lasalle, Jabberwock, Automobile, Odd No., Fittick, Vorkish, Carissima, E.S.L.A., Mannie, Sursum corda, Iphigénie, Marlow, Stratheden, Remi, Domo, L.B.C.D., Josh Billings.

Second Class.—Old Palace, Miel, Nylmat, Osborne, Ernestine, Lucretius, Margaret, Illyine, Roma, Carolus, Adohr, Dorothy Drew, Persart, Excelsior, Alured, Ernest, Jessica.

Too late for classification.—Zodiac, Danella.

The winner of the prize offered in the July number is Miss M. A. Roberts, County School for Girls, Grove Park, Wrexham

Report.

This month's competition is interesting from the fact that the longer interval given has enabled subscribers from Newfoundland and India to compete. The successful competitor has sent in a very spirited translation, but with a tendency to add to what is in the text. *Dévoyé* is somewhat of a difficulty. It means, I think, "who has missed the path to fame," and refers probably to those who are not true to their own artistic convictions. We now and again get instances which prove clearly that competitors do not sufficiently use their intelligence. For instance, one has translated *le pasteur aux principes rigides mais bon vivant dans la pratique* as, "the clergyman of strict principles though a 'bon vivant' in their observance." With a slight difference in language, two others have committed the same fault.

Prize Translation.

This new theatre will portray the folks we rub elbows with every day, in the street and in the public square; in society and in the theatres; in the restaurants and in the shops; abroad and at home; in town and in the country.

Here shall you see the self-made man in all his coarseness and egotism; the artist, mistaken in his forte, or ahead of his time; the unscrupulous financier; the business man with an axe to grind; wretched weavers in utter want; strikers starved into submission to their master's terms. Here, too,

the police spy; the parson of strictest precept, who, "himself the primrose path of dalliance treads and recks not his own rede"; the wire-pulling politician; the man of birth, full of class prejudice; and the labourer, a fixture on the farm. Here is the wanderer, forgotten by his own people, a stranger, so he feels, in the very place where he was born; the martinet; and the meek mother-of-a-family, a mere slave to her husband. Add, too, the girl who chooses her liberty rather than the drudgery at home—the iron being entered into her soul; the strong-minded woman, despising the conventions she has set at nought and the prejudices she has renounced. Such are they who play their parts in the drama realistic. Their feelings will have to submit to the most searching analysis; their characters will be probed almost too minutely; their hopes and aims will be set forth with a knowledge which nothing escapes; their hates and their loathings will be revealed in no half light; their doubts, their remorse, their very dreams will take form and shape; the dramatist will pierce the veil that covers their fond hopes deceived, lay bare their wounds—let the poor sufferers mask them with what skill they may—reveal their aspirations toward the bright ideal that is to be, and their deep despair in face of the dark reality that is.

P. G. A.

UNIVERSITY OF LONDON.

MATRICULATION EXAMINATION.

SEPTEMBER, 1905.

FRENCH.

Examiners { J. G. ANDERSON, Esq., B.A.
ELPHÈGE JANAU, Esq.

THURSDAY, September 14.—*Morning*, 10 to 1.

I. Translate into English:—

A.—*La langue française.*

La langue française est pleine de contrastes: elle étonne à la fois par sa simplicité et ses complications, par sa régularité et ses exceptions sans nombre, par sa fixité et ses incertitudes. Flottant entre la double logique du sens et de l'oreille et la tyrannie arbitraire de l'usage, la langue française offre une foule de nuances délicates et des idiotismes qui font le désespoir des étrangers. La connaissance de ses synonymes demande un tact infini et de longues études. Inconstante et capricieuse, tour à tour exubérante et concise, elle se surcharge de toutes sortes de richesses hétérogènes ou se contente de ses propres ressources: le néologisme et le purisme la séduisent tour à tour.

Telle qu'elle est, elle n'en a pas moins obtenu à diverses reprises le privilège de l'universalité . . . Nous la voyons au XVII^e^ siècle se faire accepter comme la langue littéraire de toutes les cours et de toutes les sociétés policées. Elle *devient* particulièrement *celle* de la diplomatie. Le XVIII^e^ siècle en fait l'instrument actif de la propagande philosophique et comme l'arme naturelle de toutes les libertés. La Révolution et l'Empire achèvent de la porter et de la répandre, et, quand la puissance guerrière ou politique de la France subit une éclipse, lorsque le commerce emprunte à l'Angleterre une nouvelle langue universelle, la langue des intérêts, il appartient à la littérature et à la philosophie françaises de reconquérir à la nôtre son universalité, par l'action des idées et le prestige des œuvres.

B.—*La mendiante.*

Je pleure: car j'ai vu, sur une froide pierre,
Une femme, bien pâle et bien maigre de faim,
Cependant belle encor, presser contre son sein
Un enfant, tout en pleurs, maigre comme sa mère

Elle m'a regardé d'un œil plein de prière;
Mais en montrant son fils, qui demandait du pain,
Elle n'a pas osé venir tendre la main . . .
Le mépris si souvent répond à la misère!

Et moi, je n'avais rien! Pas un franc! pas un sou!
J'ai passé *tout* honteux, triste, pliant le cou,
Et reprochant à Dieu ma profonde détresse;

Car si Dieu m'*eût fait* riche, oh! j'aurais eu bon cœur:
Chaque pauvre aurait eu sa part de ma richesse,
Et chaque malheureux sa part de mon bonheur.

II. *Either*, (*a*) Translate into French:—

Jane Austen.

Jane Austen, one of the most distinguished modern British novelists, was born on December 16th, 1775, at the parsonage of Steventon, in Hampshire, of which place her father was for many years rector. Her life was singularly tranquil and void of incident, so that but few facts are known concerning her from which an idea of her character can be formed. She was tall and attractive in person, and of an extremely kind and gentle disposition. Under her father's care she received a sound education. She had a fair acquaintance with English literature, knew French well and Italian slightly, had some taste for music, and was noted for her skill in needlework. At a very early age she seems to have begun to exercise her faculty for composition, and wrote several short tales and fragments of larger works, some of which have been found among her papers. These first essays are written in a remarkably pure and vigorous style, and are not unworthy of her later reputation. She died on the 18th July 1817, at Winchester, whither she had removed for change of air and scenery.

N.B.—*Candidates who take the* (b) *alternative are reminded that the* (a) *alternative is the standard to be aimed at both as regards quality and quantity.* Mere padding and idle repetitions should be avoided.

or, (*b*) Write in French an essay of about 20 lines (*i.e.* about 200 words) on *one* of the following subjects:—

Le programme des études devrait-il être le même pour les deux sexes?

Le printemps.

III. Grammar.

1. Rewrite in French extract A. from *Nous* (l. 14) to *répandre* (l. 20) in the past indefinite, negative-interrogative form (= have I not spoken?), making and underlining all the necessary changes.

2. Parse (in French preferred), the eight words in italics in A. and B.

3. Give in columns:—

(*a*) The 3rd person plural, indicative present, and the 1st person plural, preterite (= past definite, *e.g.* j'aimai) of *se surcharger, reconquérir, obtenu, fait, tendre;*

(*b*) The 1st person plural, imperfect indicative, and the 2nd person singular, subjunctive present of *subit, vu, séduisent, devient, achèvent.*

4. Write the first two lines of the second stanza of extract B., *either*, in phonetic transcript (indicating the system employed), *or*, copy them in ordinary script, using the following marks:—

( ) Enclosing all silent consonants.
‿ Between two words to indicate *liaison.*
~ Over a vowel to show that it is nasal.
ɛ To indicate the open vowel sound nearly as in *there, fare.*

5. Formez (*a*) des questions qui ont rapport aux mots en italiques dans les phrases suivantes (voir A et B), (*b*) des phrases complètes en réponse à ces mêmes questions, évitant la répétition inutile des mots de la question.

(*Exemple*: Il a vu *la femme* sur une froide pierre. Q. Qui a-t-il vu sur une froide pierre? R. Il y a vu la femme.)

(*a*) Le passant a reproché à Dieu sa *profonde détresse.*
(*b*) *La mendiante* n'a jamais répondu à ma lettre.
(*c*) La langue française est pleine *de contrastes.*
(*d*) *Au dix-huitième siècle* elle devient l'arme naturelle de toutes les libertés.
(*e*) Elle m'a regardé d'un *œil plein de prière.*

OUR TUTORIAL SECTION

OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE.

BY ARTHUR T. FLUX,

Late Principal of the Belvedere Pupil Teacher Centre, First on Scholarship List; Author of "Scholarship School Management," "Building of the British Empire," etc.

SCHOLARSHIP COURSE FOR 1905 AND 1906.

Tenth Month—October.

Work to be Prepared.

1. *Reading and Repetition.*—Regular oral exercise is very necessary in both these subjects. Students too frequently set themselves a comparatively low standard, and are quite satisfied with what is really a very mediocre performance. Excellent reading is rarely heard, although elocution is a subject in which a teacher should certainly be proficient.

2. *Teaching.—The Teaching of History.* History is a most useful and necessary subject, and must find a prominent place in any school curriculum. It affords means of mental training in memory, imagination, and especially in judgment. The whole of History is one long chain of cause and effect, and it is impossible to deal with any event properly and thoroughly without considering at the same time the causes which produced it and the results which sprung from it. From the utilitarian side the subject is also very valuable. No man can act as a worthy citizen of the greatest empire the world has ever seen unless he knows a good deal of its past history—the struggle for freedom, and the successive steps by which its present position has been reached.

In teaching the subject there is a very wide latitude in the choice of treatment, and much depends upon the particular point being taught and the age of the class. In the lower classes the concentric method should be adopted. Biographies of great men may be made the means of giving a good general impression of the age in which they lived. It has been said that the average man knows more about the history of the Jews from the biographies of the Bible than he does about his own forefathers, and this is to some extent true. A life of Alfred the Great, properly treated, should give an insight into Anglo-Saxon methods of life, dress, food, amusements, institutions; and, by the great law of association of ideas, these facts are remembered more easily in connection with a man and his life than they would be if they formed the subject of a separate lesson.

In the upper classes a general survey may be made of English History, but considerable judgment must be exercised in order to omit the unnecessary and include the essential. Two other points should also be noted. (*a*) An attempt should be made to give children in the upper standards some general idea of the world's history—the general shaping which has taken place to produce modern conditions, not only at home, but abroad. (*b*) Special stress should be laid, particularly in boys' schools, upon what may be called the citizenship aspect of history. No man can usefully exercise his right to vote who has not some idea of his rights and privileges as a citizen, and how and why they have been obtained.

N.B.—All scholarship students should read very carefully the "Suggestions for the Use of Teachers," issued by the Department. Although impracticable under present conditions in some respects, these suggestions are, on the whole, most useful and helpful to the earnest teacher—and this should include all teachers. They should go far to counteract the somewhat wooden and dogmatic methods which have obtained in many schools.

3. *Drawing.*—Two copies per week should be drawn of specimens from nature or photographs of casts. Remember the instructions, that the drawing must fairly fill a half imperial sheet of paper. I shall be pleased to criticise any specimens submitted to me.

4. *Music.*—Pulses. Measures. Divisions of a pulse into halves, quarters, thirds, &c.

This is a comparatively easy section of the work. Care must be taken to write the pulse signs correctly and neatly. Note that the half of | d :-.d | is | d ., d | and *not* | d .-, d | Similarly the half of | d :— | is | d : | and not | d .- : |

The following are a few questions on this:—

(1.) What is a measure? a pulse?

(2.) Rewrite the following, (*a*) halving the value of every note and rest, and (*b*) again doubling the value of every note and rest:—

| s :s .f | m :- .f | r : | d :— |

(3.) Write a passage in 6-pulse, 4-pulse, and 3-pulse measures in primary and secondary form. *N.B.*—A piece is in the primary form when the first note commences a measure, *e.g.* | d :- .r | m :- .f |; in secondary when the first note does not commence a measure, *e.g.* | : d | r :m |, or | : | d :r |

(4.) Write the following in 4-pulse measure. The figures show duration in pulses or fractions of a pulse. Begin on a strong pulse: —

(*a*)

2½	½	½	½	1½	½	½	½	1	½	½
m	s	f	t,	d	r	m	rest	rest	l	s
½	½	½	1	½	½	½	½	½	½	½
f	m	s	d	rest	t,	r	d	t,	rest	d.

(*b*)

1½	½	½	½	½	½	½	½	1
s	m	f	l	r	s	f	rest	m
½	½	½	½	½	1	2	1	
r	m	f	s	m	r	d	rest.	

(5.) Write (in figures) very distinctly over each note and rest in the following passage its value in pulses or fractions of a pulse:—

{ | s :d .r :m | s :- .s .f :m .f .s | f .- .r :m .f .s :d ‖

(6.) Write as many measures as are required for the following words, and place, according to the accents, a syllable of the words under each pulse:—

(*a*) "The curfew tolls the knell of parting day."
(*b*) "They hunt through the streets with deliberate tread."

5. *Penmanship.*—Write a page daily in the *Practical Teacher Copy Book*, and use great care at all times if you wish to secure good marks. Writing is generally one of the weakest subjects submitted to me for criticism.

6. *Composition.*—Write one or two essays each week on such subjects as:—

(*a*) The duty and expediency of truthfulness.
(*b*) On making up one's mind.
(*c*) The importance of accuracy in little things.
(*d*) The Commonwealth of Australia and its prospects.
(*e*) The decay of the feudal system.
(*f*) Westminster Abbey and its associations.
(*g*) Belief and credulity.
(*h*) China and the Chinese.

Read up the subject if necessary. In any case think well over and make out a skeleton plan before commencing to work. Let the essay contain your earnest, real thought, and not merely borrowed ideas which you have not digested. The following

notes may be of assistance in indicating *one* way in which each topic may be treated :—

(*a*) Truthfulness is a duty we owe to others. Not only is it morally wrong to lie, but it is inexpedient. "Honesty is the best policy" in word as well as in deed. Living in a community as we all do, there must be some accepted principles on which we all act. Suppose the state of society in which no one's word could be taken, where if we asked for information we could never assume that the answer was correct. Life would be impossible. Whether there are ever cases in which lying is justifiable is a much debated point. A spy when taken prisoner might by telling a lie save an army, by lying to any one in a furious passion a murder might be averted. Is it well to lie in such cases?

(*b*) "Making up one's mind" is a process of reasoning. Before deciding on any course of action the *pros* and *cons* are (or should be) carefully weighed and a decision arrived at. We are doing this all our lives, in some cases our arguments are wrong, and we suffer. Some people can rarely arrive at a just conception of the relative merits of the *pros* and *cons*, others decide without considering them at all. The successful man is the one who balances the two sides carefully, and arrives at the correct solution in the majority of cases, but no man is infallible.

(*c*) This is sufficiently obvious. It is the little things that make the big things. The man who can pay no attention to details never succeeds in great things. Innumerable instances of this may be quoted. The man who knows every detail of his business is more likely to succeed than one who has to trust to others. Inaccuracy in little things is speedily followed by inaccuracy in all things.

(*d*) The geography will supply all that is needed here. The great hindrance to advance is the tendency to crowd into the cities instead of developing the land.

(*e*) A knowledge of history is necessary. Point out how that, while the system might be a good one in very early times, it was impossible for it to continue under better circumstances. In the Dark Ages, when every man's hand was against another, a strong offensive and defensive alliance of the people of one state or town was necessary, but with the advent of learning, better means of communication, and a greater variety of work, the system rapidly became obsolete. The causes which assisted in its downfall should be traced.

(*f*) To those who have visited the Abbey, this is easy, provided they went with eyes to see and ears to hear. For second-hand ideas, Sir Roger de Coverley's thoughts as given in the *Spectator*, and Washington Irving's in the *Sketch Book*, will be of assistance. The latter is one of the finest pieces of English prose, and is well worth careful study both by those who intend to go and by those who have already been.

(*g*) What is the difference in these terms? Belief is the acceptance of the truth of a statement on sufficient evidence, credulity —on insufficient evidence, or none at all. We believe that the sun is some 93 million miles away, although we cannot measure the distance; that Australia exists, though we have never seen it; that the Armada was defeated in 1588, though we cannot prove it. Why? The concurrence of opinion of many men, or the dictum of one man if he be of sufficiently known worth, convinces us. We (most of us) disbelieve in the sea serpent, because we consider the testimony of those who have seen it unreliable. If a well-known scientist, say Lord Avebury, assured us that *he* had seen it, we should probably believe. The credulous believe on insufficient evidence or none at all. There is a west country saying which many people implicitly believe, "Wet on Friday, wet on Sunday, wet on Sunday, wet all the week through," although it is obvious that once it rained on a Sunday, it would never stop according to this rule.

(*h*) The Text-Book will supply sufficient material for this, although it would be advisable to read the account of some one who has lived in or travelled through the country. "The Heathen Chinee," as Bret Harte dubbed him, is but little understood by the European. We look at his pigtail and inscrutable face, and put him down as "peculiar," forgetting that his country has a population far exceeding that of Europe, a civilisation that was far advanced when Stonehenge was built, a literature to be proud of, a system of society which has solved many problems that we are only beginning to discuss.

7. *English.*—Learn 15 roots and meanings each week.

(2) French and Latin words and phrases in common use.

(3) *Henry V.*, Act IV., Scenes 6, 7, and 8.

(4) Prepare a good life of Shakespeare.

(5) Prepare answers if necessary to the following questions:—

(*a*) Analyse the following in tabular form.

> A man that *once* did sell the lion's skin,
> While the beast lived, was killed *with hunting him.*
>
> *A many* of our bodies shall no *doubt*
> Find native graves; upon *the* which, I trust,
> Shall witness live in brass of this day's work.

(*b*) Parse full the words in italics.

(*c*) Distinguish between the uses of *I shall* and *I will.*

(*d*) What is the case and government, if any, of each of the italicised words in the following sentences :—

(i.) Prize *me* no prizes, for my prize is *death.*

(ii.) She let *concealment*, like a *worm* in the bud,
Feed on her damask cheek.

(iii.) For my *brethren* and companions' sakes.

(iv.) That is not for such as *you.*

(*e*) Explain the use of *a* and *the* in the following phrases :—

(i.) Oft on a plot of rising ground
I hear the far-off curfew sound.

(ii.) The more the merrier.

(iii.) Twice a day.

(iv.) I go a-fishing.

(*f*) When is the Subjunctive Mood used? In what Tenses and Persons are there special forms for the Subjunctive Mood in English?

(*g*) Correct or justify the syntax of the following sentences :—

(i.) The three Miss Smiths have arrived.

(ii.) She has taken no meat nor drunk no wine this two days.

(iii.) The peasantry of France wears blouses.

(iv.) The fleet are under orders to sail.

(v.) Avoid those kind of actions.

Notes.—(i.) There is little in the scenes set that calls for comment. All the allusions and notes must be thoroughly prepared. The first time of going through a play is hard work, which is absolutely necessary before any wider views or criticisms can be entertained. A thoroughly good knowledge of the text must be obtained.

(ii.) The life of Shakespeare consists for the main part of hazy guesses. Of the man who stands admittedly the world's greatest dramatist we know little, and although it might be of interest to us to know all the details of his life and conversation, as Boswell has given us Johnson's, this sinks into comparative insignificance when we come to attempt an estimate of his character and genius. Why does he stand foremost in an age of giants? What are the characteristics of his plays that have led to the acclamation of the whole world? It is hardly to be expected that the young student who has studied one play only can arrive at any just appreciation of his wonderful ability, especially when the attention is concentrated on the details of analysis and parsing and the peculiar use of words. It is as if one studied a famous picture with a magnifying glass at a distance of one or two inches. It is not till all the plays have been read and re-read that the wonderful genius of the writer begins to grow on us, that we begin to appreciate clearly that we are confronted with a giant intellect. The very ease and naturalness of the various characters deceive us. They are like old friends who are continually exhibiting some trait of character which we never suspected. They are real men and women that we become attached to, that we admire, but whom we can in many cases never fathom. Other writers have depicted characters that are shallow and empty; we know them at once; if they are to be villains, they are that—and nothing else, if heroes—that only. Such men never exist. Any man and every man is a profoundly complex problem, and such are Shakespeare's characters. Hosts of writers and dozens of actors have attempted to prove to us that Hamlet was mad—or sane—but we still hesitate about it. Now we are convinced that he is sane, now that he is shamming insanity, now that he is really insane. The reason is that Shakespeare has made his character true to life, and not a mere paper creation. It is not in the number of words employed, or in the number of plays written, or in the mere composition that he excels, it is his profound knowledge of human nature that lifts him far above his contemporaries, and they were above all others. Read some serious criticism if you can, Lamb's ideas, or Hazlitt's estimate, or Professor Saintsbury's, and try to get a truer and wider estimate than is possible while digging into notes or single words.

8. *Geography.*—(*a*) New Zealand.

(*b*) Revise South America.

(*a*) There is little need to add anything to what may be found in a good text-book on New Zealand. Mere lists of names do not form geography. You will have time in a month to read up something of the history, of the resources, of the character of the scenery, &c. Excellent handbooks may be obtained from the agent of the colony for the asking. Above all, draw maps to fix all details.

(*b*) In revising South America use the Test Questions in Geography by Meiklejohn and Holden to test your knowledge.

If you can answer all the questions there set, you may close your book. Note particularly the character of the country as a whole, its general build and watershapes, its magnificent waterways, and its potential wealth. The form of government is everywhere Republican. Draw maps continually.

9. *History.*—The reign of Henry VII. Prepare this very thoroughly. The following points require attention:—

(*a*) Henry's descent and claim to the throne.

(*b*) The plots formed against him. Note the easy manner in which they were suppressed. Why?

(*c*) The cause of the great personal power exercised by the Tudors.

(i.) Old nobility and feudal system destroyed—new nobility subservient.

(ii.) House of Commons not yet strong enough to exercise control.

(iii.) Personal riches, rendering them independent of the kingdom.

(iv.) Their character. Strong, resolute, but tactful.

(v.) The possession of the only artillery in the kingdom.

(vi.) The Church, alarmed at the Reformation, looked for support from the Crown.

(*d*) The king's ways of raising money. Benevolence, Star-chamber, &c.

(*e*) The beginnings of a new era—geographical explorations—Revival of Learning, &c.

(*f*) The foreign policy—a new theory—and the marriage of his children.

The whole reign must be read up very carefully, not only the events committed to memory, but their bearing on after history studied.

10. *Arithmetic.*—Square Root and its applications.

For general practice the student cannot do better than work through the Miscellaneous Exercises given at the end of Christian and Collar. Take the first 100 for this month. It will not be necessary to work every sum, but all those about which any doubt is felt should be worked. If any insuperable difficulty occurs in the work consult the Key.

11. *Algebra.*—Continue exercise in problems leading to Quadratics.

Work the following Test Paper:—

1. Express algebraically the statement that the cube of the sum of two quantities is equal to the sum of their cubes and three times their product into the sum.

Ans. $(a+b)^3=a^3+b^3+3ab(a+b)$.

2. A sum of money can be paid with a coins worth m pence each, together with b coins worth n pence each. m and n being prime to one another. What is the condition that it may be payable with c coins of the former kind and some of the latter? And if that condition is satisfied, how many of the latter will be required. Ans. (i.) n must be a factor of $a-c$.

(ii.) $\frac{m(a-c)}{n}+b$.

3. Given that $\frac{b\pm\sqrt{(b^2-4ac)}}{a}=\frac{b\pm\sqrt{(b^2-4ac)}}{a}$

Show that $(ac-ac)^2=(bc-bc)(ab^1-ab)$.

4. Find the term involving a^2b in the product of $a^3+3ab+5b^2$ by $3a^3-5ab+4b^2$ without performing the whole of the multiplication. Ans. $4a^2b$.

Divide $1-x+x^2-x^3$, &c. $-x^{2p+1}$ by $1+x^2+x^4+$&c. $+x^{2p}$. Ans. $1-x$.

5. Solve the equations—

(i.) $4x+3y=9\frac{2}{3}$.
$5x-2y=5$ Ans. (i.) $x=1\frac{1}{2}$ $y=1\frac{1}{3}$.

(ii.) $6x+5=5\sqrt{2x^2-1}$. Ans. (ii.) $x=5$ or $-\frac{5}{7}$

(iii.) $a+\frac{x}{2}=\sqrt{\left(a^2+\frac{x}{4}\sqrt{(24a^3+x^2)}\right)}$ Ans. (iii.) $x=a$ or 0.

6. A and B started together in a race. At the end of 5 minutes, when A had run 900 yds. at a uniform pace, and was 75 yds. ahead, he slackened his speed by 20 yds. a minute, and reached the winning post half a minute after B, who ran uniformly throughout. How long did the race last? Ans. 36 min.

7. The price of coffee being raised a pence per pound, b pounds fewer can be purchased for 2 ab pence. How much per cent. is the increase in the price? Ans. 100 %.

8. Why does the H.C.F. of two algebraical quantities not always agree with their G.C.M. when the quantities are replaced by numbers? Give an illustration.

(*Solutions given next month to any that are difficult.*)

Women.—Continue exercises on Simple Equations.

12. *Euclid*, Book I., Prop. 45–48, with four deductions per week.

Women.—Props. 33–36, with three deductions per week.

13. *Science.*—Chlorine and sulphur. Mode of occurrence (free or combined), preparations, experiments to show properties, chief compounds.

14. *Spelling.*—Learn 100 words per week from *Words Commonly Misspelt*, Series B, C, or D.

Test Questions.

1. *Copy Setting.*—Large hand. Genealogically.

Small hand. Suppose the Ambassador of the French comes back?

2. Explain the various kinds of metre, and scan and name the following:—

(*a*) And generally to the crown and seal of France.
(*b*) A good soft pillow for that good white head.
(*c*) Let us condole the knight; for lambkins we will live.
(*d*) The way was long, the wind was cold.
(*e*) Take her up tenderly.
(*f*) Roll on, thou dark and deep blue ocean, roll.
(*g*) Better fifty years of Europe than a cycle of Cathay.

3. How far is Shakespeare's picture of the battle of Agincourt in accordance with historical truth?

4. Give some account of Bacon's chief works, and point out their importance.

5. What effects have the physical peculiarities of Australia upon its development?

6. Give an exact account of the Government of the Commonwealth.

7. Say what you can of Mexico under these heads: (*a*) Relief; (*b*) Mineral Wealth; (*c*) Towns; (*d*) Government.

8. Give some account of the causes of Cade's rebellion.

9. Discuss the merits of the rival Yorkist and Plantagenet claims to the throne.

10. What advances were there in the constitution during the Lancastrian period

11. Work the following. (Time one hour.)

(*a*) Divide 73436 by 105, using the method of factors, and explain clearly how you calculate the remainder. Ans. 699+41.

(*b*) Find the L.C.M. of 20, 15, 12 and 9, and prove that your result is the L.C.M. Ans. 180.

(*c*) Express $\frac{3}{11}$ of 6s. 5d. $-$ £·0125 as the decimal of £1, 16s. Ans. ·04116.

(*d*) The average age of a committee of seven trustees is the same as it was four years ago, a young man having been substituted for one of them. How much younger was he than the trustee whose place he took? Ans. 35 years.

(*e*) Divide 12826 proportionally to the numbers ·16, ·4, ·125. Ans. 2904, 7744, 2178.

12. How would you give a lesson on the Thames or any other river?

PUPIL TEACHERS' COURSE.

For Candidates' Examination, 1906.

Work to be Prepared.

1. *Reading and Repetition.*—The oral practice must be steadily kept up.

2. *English*—

(1) Learn 10 roots and meanings each week.

(2) Prepare carefully the grammar of the adverb.

Learn a good classification and exact definitions.

Distinguish carefully between adverbs and conjunctions—*e.g. when, where, why,* &c., are always conjunctions except when they commence a question.

Note the exact meaning of here, hither, hence; where, whither, whence; there, thither, thence.

Such words as wherein, whereby, etc., are generally called relative adverbs.

In such sentences as go *home;* it weighs 3 *pounds;* he walked a *mile,* the words in italics sometimes present a difficulty. They are nouns—not adverbs—in the Adverbial Objective Case.

The is sometimes an adverb, *e.g.* the more the merrier, the farther you go the less you see.

There is sometimes used as an Introductory Adverb when the verb of the sentence precedes the subject, *e.g.* there lived a king, there was a time, etc. In such cases there is no suggestion of *place*.

(3) *Marmion*—Prepare stanzas 9-16, Canto III. Be prepared to parse any word or analyse any sentence. If any difficulty is experienced, students are invited to write for assistance.

(4) Write an essay each week on such subjects as—

(*a*) A sea voyage.

(*b*) Observation.

(*c*) The use and abuse of stimulants.

(*d*) Lifeboats and their services.

Do not attempt to write till you have thought the subject well over and arranged a brief outline of what you wish to say. Let your style be natural, do not attempt any high-flown language, study the essay when written to see where you can improve, and test the balance of the sentences by reading the whole aloud. The following notes may help.

(*a*) A very common experience at the present time. Point out the arrangements made for comfort and security of passengers—the life on board, possible dangers, description of storm, etc.

(*b*) Define the term. To observe is to look *and think*. From morning till evening the eye is receiving impressions, but few are permanent because the brain is otherwise occupied. If you look casually at a flower you remember nothing; if you observe, you see and think about everything. Many people go through their lives with their eyes shut, others observe closely and profit by it. Show the importance of training the habit in children.

(*c*) A stimulant (Lat. *stimulus*—a spur) is something which spurs some organ of the body to extra exertion, *e.g.* alcohol increases the rate of the beating of the heart. They must be used judiciously. As a whip is sometimes necessary to a lazy horse—and does it no harm—so a stimulant is sometimes needed for the body. The abuse lies in taking them in excess or when unnecessary.

(*d*) Describe the construction of the lifeboat, its uses, the character of the crew and their heroism; why particularly necessary in some places, *e.g.* Deal and Dover.

3. *History*—Edward I. and Edward II.

The reign of Edward I. is a very important one. His policy may be divided into two heads—(1) the desire to place the whole island under one king; (2) the wish to reform the law and law courts. In connection with the first you must read up very carefully the conquest of Wales and the conquest of Scotland. Note how and why Edward interfered in Scotch affairs—the claimants to the throne, his refusal to decide until he was acknowledged as suzerain, and how he used that position to worry Baliol into open disobedience or revolt, and the events which followed.

Many very important statutes were passed, the dates and provisions of which must be tabulated and committed to memory. The Statute of Mortmain (*De Religiosis*) is very important as checking the power of the Church. You must think out the *necessity* for each law and the objects it had in view. The law courts were subdivided, and for the first time properly organised.

4. *Geography*.—The Balkan Peninsula.

Previous to last century this was all part of the Turkish Empire, which since 1820 has been crumbling to pieces. To understand the political geography at all, you must remember that there are two classes—the Turks, the conquerors, with all the vices of the Oriental; and the native peoples, Servians, Roumanians, Bulgarians, Greeks, etc., who have been trying to throw off the very heavy yoke of their rulers. The Turkish rule (or misrule) had turned the most prolific and fertile corner of Europe into a hotbed of discontent and a region of poverty. Greece fought for and obtained its freedom in 1830, and after the war between Turkey and Russia in 1877 came the Berlin Conference, by which (1) Roumania became a separate kingdom; (2) Servia ditto; (3) Bulgaria a principality, to which, a few years later, was added Eastern Roumelia; (4) the independence of the Prince of Montenegro was recognised; (5) Bosnia and Herzegovina were handed to Austria. This left the Turkish dominions very much reduced. The climate and productions can be taken together largely for all the countries. Draw maps for each country. Note the historical associations of Greece. Prepare the whole of the peninsula thoroughly.

5. *Arithmetic*.—Practice, Invoices and Bills.

Read up what is said in the text-book (Christian and Collar), and work as many of the examples as possible. In practice work by the quickest method, using subtraction as well as addition—*e.g.* in finding the cost of 960 articles at 19s. 11½d. each, it is much easier to say 960 at £1 = £960, and then deduct the cost of 960 at ½d. = £1—total, £959—than to proceed in the usual way. Note also such sums as—What is the weight of 2 miles 3 furlongs 25 poles of wire at 1 ton 15 cwt. 2 qrs. 14 lbs. per mile.

In bills also work by the quickest methods. If such a sum is set, it is usually to test the ingenuity of the student rather than his power of correctly but laboriously working.

6. *Algebra*.—Hall and Knight. Division. Work Examples VIa, VIb, VIc.

7. *Geometry*.—Euclid, Book I., Props. 17-20, with two deductions per week.

Continue the exercises in the practical geometry.

8. *Music*.—Tonic-Sol-Fa. The names of the notes. Octave marks. Mental effects.

(The best book to use is Stanton's Notes for P. T.'s, price 6d. Curwen and Son.)

9. *Science*.—Heat. What it is. The difference between temperature and heat. Effects of heat on various substances. The expansion of water from − 10° C. to 100° C., noting the point of maximum density. The distillation of water.

10. *Spelling*.—100 words weekly from *Words Commonly Misspelt*.

11. *Penmanship*.—Write a page daily in the *Practical Teacher Copy Book*, and use the greatest care at all times.

Test Questions.

1. Write as specimens of copy-setting:—

   (1) Large hand—Efflorescence.

   (2) Small hand—"Every Man in his Humour" was written by Ben Jonson.

2. Analyse the following, and parse words in italics:—

   Still fixed on Marmion was his look,
   Which he, who *ill such* gaze could brook,
   Strove by a frown *to quell*.
   But *not* for that, though *more than once*
   Full met their stern encountering glance,
   The Palmer's visage fell.

3. Give some rules for the correct use of *who*, *which*, and *that*. Distinguish between emphatic and reflexive pronouns.

4. Describe the events which led to the signing of the Magna Charta. Give a very brief summary of its provisions.

5. Write a life of De Montfort, and say what you can of his Parliament.

6. Describe a fortnight's holiday in Switzerland, the places visited, and the chief objects seen.

7. Describe a coasting voyage from Naples to Venice, illustrating your answer.

8. Complete each of the following bars by adding one note:—

9. Describe exactly how you would make and graduate a mercury thermometer.

4. Work the following:—

   (1) Express 27 decametres in inches, a metre being 1094 yds. Ans. 10633·68.

   (2) 1 lb. being equal to ·4356 kilograms, express 15 tons 12 cwt. 2 qrs. in kilograms. Ans. 15,246.

   (3) How many grams are there in 7 quintals 65 Kg. 9 decag.? Ans. 765,090.

   (4) Express 27 miles 5 furlongs 184 yds. in metres, if 1 metre = 39·3708 inches. Ans. 44 kil. 625·56 metres.

   (5) If a litre = 1·76077 pints, show that a hectolitre = 22 gallons nearly.

All communications respecting this Course to be sent to Mr. ARTHUR T. FLUX, Oakleigh, Belvedere, Kent, together with the coupon of the present number, and a stamped addressed envelope if an immediate answer is required.

OUR CERTIFICATE COURSE FOR 1906.

BY GEORGE COLLAR, B.A., B.SC.,
Head-Master of Stockwell Pupil-Teacher School.

Test Questions on Last Month's Work.

THEORY OF TEACHING

1. Which do you consider the best order for teaching the letters? Justify your choice.
2. Give a short summary of the educational principles laid down by Frœbel.
3. Describe Frœbel's seven gifts, and show the purpose for which each was intended.

ENGLISH LANGUAGE AND LITERATURE.

1. Give a short sketch of Colonel Everard and Sir Henry Lee.
2. In what particular sense does Milton use the following words:—*convolved, illaudable, infamy, phalanx, obnoxious, affect, ambient, missive ruin, incentive, whelmed, assessor.*

ENGLISH HISTORY.

1. Discuss the claims of Henry IV. to the throne, and say how the nature of it affected both his foreign and his home policy.
2. Trace the relations between England and Scotland during the first half of the fifteenth century.
3. Trace the career of Richard of Gloucester, laying special stress on the circumstances in which he gained and lost the crown of England.

GEOGRAPHY.

1. What principles seem to have been followed in fixing the local boundaries in Great Britain?
2. Describe the non-manufacturing industries of Great Britain.
3. State as fully as you can the geographical conditions that have led to the development of the trade of London.
4. Why have Bristol and Chester a moderate rainfall as compared with many other places in the west of England?

ARITHMETIC.

1. State and prove the rule for dividing one vulgar fraction by another.
2. How would you explain to children that after dividing by a proper fraction the quotient is greater than the dividend. What concrete or graphic illustrations would you use?

ALGEBRA.

1. If a and b be any positive integers, prove that—
$$a \times b = b \times a.$$
2. Simplify $\dfrac{a^2+ab}{a^2+ab+b^2} + \dfrac{a^2-ab}{a^2-ab+b^2} - \dfrac{a^4-a^2b^2-b^4}{a^4+a^2b^2+b^4}$
3. Find the H.C.F. and L.C.M. of—
$$3x^2 + 14x - 5 \text{ and } 3x^2 + 8x - 1.$$

GEOMETRY.

1. Construct a right-angled triangle, having given the hypotenuse and one side.
2. If in a right-angled triangle one of the acute angles is double the other, prove that the hypotenuse is double the smaller side and conversely.
3. Solve the following equations by the aid of graphs, and check your results algebraically:—

(i.) $2x + 5y = 7$, $y - x = 0$ (ii.) $5x - y = 3$, $3x + 2y = 8$

GENERAL ELEMENTARY SCIENCE.

1. In what ways may a line be used to represent a force? Give instances of calculations of forces that may be worked graphically.
2. What is meant by mechanical 'work'? How is it measured? Does a man do more work in carrying a basket of bricks up a ladder than in hauling them to the same height by a pulley?
3. Explain how you would find the specific gravity of a substance lighter than water.

Notes and Syllabus for October.

ENGLISH COMPOSITION.

Prepare Chapters IX. and X. of *The Art of Writing English*. The first of these opens up a very interesting subject, and one that is of the greatest importance to one who wishes to write English perfectly. Since we have words of English origin and words of foreign origin with almost the same signification, great discrimination is required to select the word that most exactly conveys our meaning, and since there is generally a greater amount of simplicity about the English expressions, it requires judgment to decide whether our ideas can be most appropriately clothed in simple language or in words of a more exalted style. This chapter will give the student much help in this direction.

Students using Nesfield should work through Chapters VI. and VII., including the exercises.

Prepare essays on the following:—
(*a*) Prejudice;
(*b*) The Anglo-Japanese Alliance;
(*c*) "The exception proves the rule;"
(*d*) Mountain climbing.

THEORY OF TEACHING.

Prepare Chapter VIII. of Collar and Crook's *School Management*, and pay particular attention to the scheme for classifying difficulties in spelling.

The student should get the excellent little book by Dr. Hayward, entitled *The Educational Ideas of Pestalozzi and Frœbel* (Ralph Holland & Co.), and as few of them can probably read the works of Frœbel in the original German they should study the translation by W. F. Herford, published by Isbister & Co., called *The Student's Frœbel*.

For this month prepare the biography of Frœbel and introduction, also take the first section — The Nursling. The introduction gives a good summary of Frœbel's ideas, and we see that his view of the special destiny of man, as a being endowed with perception and reason, is that he should become fully and clearly conscious of his own essence—"the Divine element that is within him"—and manifest this forth in his life. Hence Frœbel defines the education of man as the awakening and training of man to consciousness and reflection, so that his outward life may be an expression of this inward law. This definition, and any other similar statements the student meets with, should be entered in the notebook and committed to memory. "The aim of education is to produce a pure, faithful, complete, and therefore holy, life." If it is successful in its aims "education will guide a man to the understanding of himself, to peace with Nature, and to union with God. Education, therefore, has to raise the human being to a knowledge of himself and of humility, to a knowledge of God and of Nature, and to the pure and holy life which follows from this knowledge." Frœbel then gives a most useful recommendation, although it is not stated in very clear terms, about not inferring from the outward to the inward, which we may extend into a Christian rule not to be in haste to attribute bad motives. The outward acts are not always the best things to judge another by: one pupil may commit very serious breaches of rules without intending to do so in his heart, while another may be more malevolently disposed, and yet sail so near the wind as to keep practically within the letter of the law. Frœbel then assumes that a young human being aims surely, if unconsciously, at what is best for itself. This assumption is true only within certain limits, and although it is illustrated by such comparisons as the natural tendency of ducklings to go to the water, or of chickens to scratch for food. There are, however, occasions when the desires of children may be compared rather with the propensity of moths to fly into the candle-flame. The true position seems to be that the educator should observe the child's desires and consider which of them may be gratified to the child's advantage. Spenser has shown us that many of the tastes of children, for example, their liking for sugar, are due to the fact that such things are good for them. The teacher must observe the child's nature, and aid it in the development of the child, not attempt to force the child to develop in a way that is contrary to nature. Although it may be thought that the pruning of a vine or fruit-tree is a violation of the laws of growth, yet it is really nothing of the kind, but a treatment strictly in accordance with the natural law for the development of productive shoots and fruit spurs. So coercion is sometimes necessary, but it must be administered in such a way as to evoke love from within. "Wherever pressure destroys inward activity, and severity engenders rebellion and falsehood, *there* all genuine education—all true work of teaching and instruction—is at an end." The teacher should lead the child to see that he is not giving commands in his own interest, but in the cause of abstract right. Frœbel does not deny that the child's desire to please those whom it loves should be utilised in the formation of good habits, but the child must be led to see that the parent's commands are only an expression of the general law to which he himself is obedient.

Each child and each generation must go through an epitome

of the development of the human race; but it must be by growth and unfolding, in response to the natural stimulus from within. We can hardly agree with Frœbel in regarding smiling as the dawning of the social feeling; it depends on the cause. A child may lie in a room and smile and coo from the mere pleasurable sensation of warmth, &c., not from the pleasure of any one's society. The twenty-third paragraph is important, as showing that Frœbel considers that some things that children desire are not good for them, and therefore should not be supplied, and that children soon perceive the weakness of those who give them what they want merely to stop their crying. Locke's remarks on the spoiling of children by excessive humouring should be read in connection with this section. The remarks on the importance of example are weighty, though they are not original or specially peculiar to Frœbel's system. The interdependence of the different stages of development is to be noted: "The vigorous and complete unfolding and improvement of each succeeding stage of life depends on the vigorous, complete, and original development of each preceding stage. . . . A boy is not a boy, or a youth a youth, simply because he has attained the age of boy or youth, but by virtue of having lived through, first childhood, then boyhood, faithful to the claims of his soul, and mind, and body. Just so man becomes a man not simply by reaching the average years of manhood, but by fulfilling the duties of all preceding stages of life—childhood, boyhood, and youth." Hence precocity is not to be encouraged. The introductory chapter concludes by insisting on the necessity of the practical side of education. We not only "learn by doing," but also prove our education to be real by our directed activity. "'God created man in His own image, in the image of God created He him;' therefore man ought to create and work like God."

The chapter on the "Nursling" is somewhat crude as a psychological sketch, but it shows that Frœbel recognised the necessity for a complete course of child-study beginning from the cradle. In the early years the child is largely receptive. The business of the parent and teacher, apart from the provision of food and clothing, is to teach the child to observe and appreciate nature, to name things aright, and to take a cheerful view of everything. Play should be its chief occupation, and from the zeal with which a child throws himself into his play we can to a certain extent calculate the interest he will take in his work later on; but we think that he "will further his own and other's good by self-sacrifice," only if he be taught self-sacrifice in his play. If a child in playing knocks his head against the table and his mother proceeds to "whip the naughty table," the child is likely to grow up spiteful and revengeful. Self-sacrifice in later life can only result from the endeavour to further the happiness of others when opportunity arises in the play. Hence the value of combined games for children.

If the child shows a disposition to sing to itself this should be encouraged, but no artificial means should be used to get the child to stand or walk. The child should not be scolded when its natural curiosity has led it to pull a thing to pieces, for it is simply investigating the structure of the thing.

Children take to drawing naturally, and employ it as a means of expressing their thoughts; and in representing the number of limbs, &c., the child trains his own knowledge of number. It is worthy of remark that children pay really more attention to number than to form and position. Thus a little child in drawing a man finds nothing monstrous in putting the two arms on the same side of the body, so long as the number is correct. So also he draws the head with *one* nose and *two* eyes, but often places both eyes on the same side of the nose. Children delight to be with their parents, to imitate them and question them; hence parents should guide their children and encourage this propensity, and satisfy their curiosity by trying to help the children to answer their own questions. "No greater joy, no greater enjoyment, can possibly come to us from any source than from guiding our children—living for our children."

English Literature.

Read the *Fortunes of Nigel*, and take such notes as will help you to remember the general plot of the novel, its chief episodes, and the leading characters. You cannot find a better edition at a low price than the *Century Edition of Scott* (Nelson & Sons). Finish the detailed study of *Paradise Lost*, Book VI.

721. *Ineffably* = unspeakably; *in* = not, *ef* = out, and *fa-ri* to speak.

737. *Rebelled*, this is a past participle qualifying the demonstrative pronoun "these."

739. *The undying worm*, an allusion to the Scriptural phrase "where their worm dieth not."

740. That could revolt from the obedience that was in justice due to Thee.

741. *Whom*, the antecedent is *thy*. It is rather a forced expression to say that "to obey any one *is* happiness." We do, however, sometimes come across this construction—"Whom truly to know *is* everlasting life."—*Prayer Book*.

752. *Instinct*, from Latin *instinguere*, to goad on. This is an adjective and is formed from the past participle. The same form is also used as a noun, and denotes the impulse that leads animals to act in a particular way.

761. *Urim*. The bright stones on the high priest's breast. They had oracular powers. See Lev. viii. 8; 1 Samuel xxviii. 6.

769. The number is given in the Psalms—"The chariots of God are twenty thousand, even thousands of angels."

778. *Circumfused*, literally "poured round about"; *circum*, around; *fundo, fusus*, I pour.

783. *Obsequious*, in perfect obedience; Latin, *obsequi*, to comply. The word is now used to denote a fawning kind of obedience. Notice that the word is to be parsed as an adjective, not as an adverb.

785. *This* = the object of the sentence; *obdured* = hardened against it

787. *Hope conceiving from despair*. Notice the force of this paradox. Despair is the opposite of hope, yet the despair of the rebels was so deep that it gave birth to hope.

828. *Contiguous*, touching one another; *orbs*, wheels, the Latin means either a circle or a sphere; the modern meaning is confined to the sphere; compare orb-it, the path of an orb.

879. *Her mural breach*, the opening in her walls; Latin, *murus*, a wall.

888. *Celebrated*, honoured by crowds of attendants. The Latin adjective *celeber* means crowded, populous.

895. *I have revealed*. The last twenty lines of this book remind us that we have all the time been listening to an account of Satan's rebellion given by Raphael. He was commissioned by God (Book V., 224–246) to warn Adam—"to beware he swerve not, too secure."

908. *Warn thy weaker*. Caution Eve thy weaker companion.

English History.

Prepare from 1485 to 1558. Notice how the accession of Henry VII. marks a new era in political and religious history. Owing to the heavy losses among the nobility, and to the fact that the majority of those living in the reign of Henry VII. had either been created by him or owed the possession of their estates to his favour, Henry was practically despotic. He seized his opportunity and made it illegal for any one to keep retainers. We may thus say that among the leading points of the policy of the Tudors were (i.) Repression of the power of the nobles; (ii.) the adoption of a national or patriotic policy which secured the support of the people, particularly as it was combined with some sort of show of liberty and of reference to the Commons; (iii.) A care for trade and commerce, considerable encouragement was given to commercial enterprises; (iv.) a vigorous foreign policy,—to Wolsey is due the idea of the "balance of power," a theory that one State should not be allowed to become strong at the expense of another; (v.) a sympathetic recognition of the new intellectual forces of the Renaissance.

Notice the tendencies towards the Reformation. It is too commonly assumed that the English Reformation was caused by the divorce dispute of Henry VIII. But a personal matter of the king's could not have had such a profound effect on the whole country unless there had been other influences at work; among these we must note the New Learning, and the teaching of Colet, More and Erasmus. The national consciousness was also awakened, and the patriotic feeling of Englishmen made them refuse to allow the Pope to interfere with their affairs. There were also vigorous protests against the faults and failings of the Church from Colet and other progressive spirits within, and from the Lollards without, who still felt the influence of Wickliffe and his contemporaries.

Trace carefully the course of the Reformation in England. Under Henry VIII. the Papal supremacy was abolished, and the organisation of the Church received a material blow in the dissolution of the monasteries, but the king tried to prevent changes in matters of belief and ceremonial. There were three popular outbreaks directly connected with the Reformation—(i.) The Pilgrimage of Grace, 1536; (ii.) the Revolt in 1549 in the west of England. Ket's rebellion which took place in the same year in Norfolk was mainly political, and not caused by ecclesiastical changes; and (iii.) Wyatt's rebellion in 1554.

The contemporary events in the history of Europe should be studied, as the history of England soon becomes involved in the general European history. See Freeman's *Sketch of European History*.

Geography.

Study the cities and towns of England and Wales. Try in every case to account for the origin and importance of the town. Food is not produced in towns, hence the town must acquire money to procure food from outside—how is it possible to obtain this money, and what has the town to give in exchange for the money? Consider first the seaports; they owe their origin to trade, hence they can be regarded as the great collecting and distributing agents, making money by taking goods at a low price from those who wish to dispose of them and selling them at an advanced price to those who require them. Seaports are suitable for this, because goods can be conveyed in large quantities at cheap rates over the sea. The sea is a highway which is open to all and can be traversed in all directions, and all seaports are in communication with one another. An ideal seaport is one which has a good natural harbour, capable of admitting ships of all sizes and sheltering them from storms. It must be easy of access from other ports, and must also serve as a convenient centre for the distribution of goods to a populous region behind it. This region is frequently spoken of as its *hinterland* or hinderland. In many cases goods brought to a port are transhipped to other ports and not distributed in the hinterland; such a trade is called *entrepôt* trade. We can now see why London is the greatest port in the world. It has a very convenient harbour, consisting of the estuary of the Thames and the various large docks—India Docks, Victoria and Albert Docks, and Tilbury Docks—vessels of any size can load and unload in the docks, at the wharves and quays along the bank or into barges and lighters in the open river or "pool." It has a very important hinterland, including not only the crowded metropolis but the populous southern and midland counties. It is also conveniently situated for *entrepôt* trade, as it is easy of access from most of the important ports on the mainland of Europe. The adoption of Free Trade principles has greatly favoured the commerce of the capital, as goods can be received without hindrance from all parts and re-exported under the "most favoured nation clause."

Before the development of the Lancashire cotton trade, Liverpool was not important, but with the growth of the hinterland the importance of the port grew till now Liverpool is the second port of the kingdom. Its hinterland has been extended by the construction of canals and railways; and although the Manchester Ship Canal has put Manchester into direct communication with the ocean, there are no other natural harbours on that part of the coast, so that no new port can rise to rival it.

Hull, Grimsby, Goole are the ports for the Yorkshire hinterland. Goole, and, to a less extent, Hull, both suffer from the hindrance to navigation caused by the shifting sand-banks in the Humber. Southampton is the chief port of the south coast, and its importance has increased by the enterprise of the L.S.W.R. in facilitating its connection with London. Bristol has some advantages over Liverpool and Southampton as regards its maritime position, but a careful study of all the conditions shows the importance of the hinterland to a port.

The rise of manufactures will account for the increase and development of many towns, although it hardly accounts for the actual origin of one. The water-supply is an important factor in determining the positions in which towns shall be founded, and why certain industries spring up in them. Hence we find brewing at Burton-on-Trent and other places, wool washing and woollen manufacturing on the Yorkshire streams, paper-making at Wandsworth and on the Kentish rivers. The use of a river for navigation often leads to the establishment of a town at the highest point to which goods can be taken by boat, or at the confluence of two navigable rivers, as Reading, Ripon, York, Norwich, Lincoln, Bath, Maidstone. Many took their origin from the crossing of a river by a bridge or ford, and their names bear witness of their origin—Oxford, Cambridge, Staleybridge, Chelmsford, Stratford. Many towns have risen on coalfields, and in districts where other minerals have been found and worked. Some places owe their prosperity to the natural beauty of their surroundings, which attracts holiday-makers who bring money into the towns.

Arithmetic.

Prepare the chapters on decimal fractions. Notice the two points of view from which the subject may be approached; (i.) the purely practical; (ii.) the theoretical. In the former case great attention must be paid to approximate calculations. Students frequently overlook the importance of the place value of their digits, and forget that if three or four significant digits are correct an error in the following one, or their entire omission, can make but a small relative difference in the value of the result. At the same time a study of the theory of decimals, and especially the theory of recurring decimals, has such a great educational value that the student should carefully master each of the theorems given in the book; this will not only prove of great interest, but will enable the student to arrive at many practical results without much labour.

Algebra.

Prepare Hall and Knight, Chapters XV., XVI., XVII. The importance of factors cannot be over-estimated, and readiness in resolving an expression into factors is essential if the student is to make much progress in elementary algebra. Study therefore the various types of expressions treated in the text-book.

Geometry.

Study Christian and Pratt's *Modern Geometry*, pp. 95–147. This section deals with areas and with geometrical calculations. Work all the examples.

General Elementary Science.

Take the section dealing with the composition of Matter. "Elements, Compounds, Matter in Nature, generally compound and complex. Matter is indestructible. Study of hydrogen, oxygen, nitrogen, air, carbon, sulphur, silver, iron, mercury, water, hydrochloric acid, ammonia, carbonic acid, sulphur dioxide, chalk, iron oxide, caustic potash, carbonate of soda, alcohol. Laws of combination by weight and volume."

Note that in the definition of an element we do not say that it cannot be split up into simpler substances, but that it has not hitherto been found possible to split it up into simpler substances. Before the time of Davy such bodies as caustic potash and caustic soda were regarded as elements, and indeed the old alchemists recognised only four elements—earth, air, fire, and water. But scientific researches have led to the resolution into their elements of many bodies which were looked upon as simple substances, while many new elements have been discovered. In all probability the bodies which we look upon now as distinct elements will one day be shown to consist of nothing but different arrangements of one elemental substance, in fact, the electron theory of the composition of matter already asserts that all matter consists of groups of electrons.

The great danger that the student of elementary chemistry has to face is that which arises from confusing experimental facts with theoretical explanations invented to account for those facts. Thus from careful observations made over a large number of experiments we arrive at the conclusion that *the proportions by weight in which bodies unite to form a given chemical compound are definite and constant.* This is generally known as the law of constant proportion by weight. It is found that two parts by weight of hydrogen combine with sixteen of oxygen to form water, and if we attempt to make them combine in any other proportions the element which is present in excess is left over. Sometimes, however, the same elements will unite to form *two different substances*, and in *each* case the above law applies. Thus carbon and oxygen combine in different proportions to form two different gases, one of which turns lime water milky and the other burns with a bright blue flame. In the first case the percentage composition is Carbon 27·27, Oxygen 72·72, and in the second, Carbon 42·85, Oxygen 57·15. From these percentage results we can trace no connection between the two bodies because the quantity of each element is not referred to the quantity of the other, but to the weight of the whole. If we calculate how much oxygen is combined with one part of carbon in each case, we find in the first $\frac{72{\cdot}72}{27{\cdot}27}$ or $2\frac{2}{3}$, and in the second $\frac{57{\cdot}15}{42{\cdot}85}$ or $1\frac{1}{3}$, showing that the first body contains twice as much oxygen as the former in proportion to its weight of carbon. The study of a number of similar cases enables us to state that *if two substances unite together in several proportions, then if the quantity of one be taken as a unit the quantities of the other present in the different compounds bear a simple ratio to one another.* This is known as the Law of Multiple Proportions.

From these statements we might deduce the Law of Reciprocal Proportions, which is also proved by experimental evidence. Two elements will unite with one another (if they unite at all) in the same proportions as these in which they respectively combine with a third element. Another important law of combination is the Law of the Combination of Gases by Volume, and it states that when gases combine together they do so in equal volumes, or in volumes which have a very simple relation to one another, as 1 : 2, 1 : 3, or 2 : 3.

These four laws must be remembered as the statement of facts which can be all verified by experiment.

Next month we shall consider some hypotheses or suppositions of conditions which will furnish an explanation of them.

OUR SCIENCE SECTION

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CHEMISTRY.

(ADVANCED AND HONOURS.)

BY C. A. WEST, B.SC., A.R.C.S., F.I.C.

WE have seen that Boyle's Law and Charles' Law may be deduced from the Kinetic Theory of gases. We will now deduce Avogadro's Law in a somewhat similar way.

Let us take equal volumes of two different gases under the same conditions of temperature and pressure. The product of the pressure and volume will then be the same for each gas, *i.e.* pv for the first gas $= p'v'$ for the second.

Now $pv = \frac{1}{3}mnu^2 = \frac{2}{3}n \cdot \frac{1}{2}mu^2$,

and $p'v' = \frac{1}{3}m'n'u'^2 = \frac{2}{3}n' \cdot \frac{1}{2}m'u'^2$.

Hence $\frac{2}{3}n \cdot \frac{1}{2}mu^2 = \frac{2}{3}n' \cdot \frac{1}{2}m'u'^2$ . . . (1).

Since the two gases are in equilibrium, their kinetic energies are equal, therefore

$$\frac{1}{2}mu^2 = \frac{1}{2}m'u'^2 \quad . \quad . \quad . \quad (2).$$

Dividing equation (1) by equation (2), we get

$$\frac{2}{3}n = \frac{2}{3}n',$$

and therefore $n = n'$,

that is, the number of molecules is the same in the same volume of each gas. This is what we know as Avogadro's Law.

The Kinetic Theory may also be applied to the explanation of the Laws of Diffusion, and the calculation of the velocities of the molecules of gases. Taking the equation $pv = \frac{1}{3}mnu^2$, we will rewrite it so as to get an expression for the velocity

$$u^2 = \frac{3pv}{mn},$$

or

$$u = \sqrt{\frac{3pv}{mn}}.$$

Now mn is the mass of the gas and v its volume, hence $\frac{mn}{v}$ is its density d, therefore $u = \sqrt{\frac{3p}{d}}$, or, expressed in words, the velocity of the molecule of a gas is inversely proportional to the square root of its density, and hence, when two gases are brought together, the rates of diffusion of the two gases into each other are in the inverse ratio of the square roots of their densities, a result which was established experimentally by Graham. This law is known as Graham's Law. The last column in the accompanying table gives some of Graham's experimental results, which are seen to agree fairly well with those calculated from the densities and tabulated in the third column.

Gas.	Density.	$\frac{1}{\sqrt{\text{density}}}$	Rate of Diffusion.
Hydrogen . .	0·06926	3·799	3·83
Marsh-gas . .	0·559	1·377	1·34
Nitrogen . .	0·971	1·0147	1·0143
Oxygen . . .	1·1056	0·951	0·948

The equation $u = \sqrt{\frac{3p}{d}}$ may be made use of for calculating the velocity of the molecule of any gas. Let us insert the known values of p and d for nitrogen under standard conditions.

The barometric height is 76 cms., the density of mercury 13·596, and the pull exerted by the earth on the mass of 1 gram 981 dynes, therefore $p = 76 \times 13{\cdot}596 \times 981 = 1{,}013{,}000$ dynes per square centimetre (approximately).

Taking the molecular weight of the gas in grams, that is 28 grams, we know from experiment that this mass occupies a volume of 22,380 c.c., and therefore the density $= \frac{28}{22{,}380}$.

Substituting in the equation

$$u = \sqrt{\frac{3p}{d}},$$

we get

$$u = \sqrt{\frac{3 \times 1{,}013{,}000 \times 22{,}380}{28}}$$

$= 49{,}285$ cms. per second, or more than 1000 miles per hour.

The velocity at any other temperature may be obtained by multiplying this velocity by $\frac{T}{273}$, where T is the absolute temperature of the gas.

When two different gases are allowed to come together, the molecules of each move independently, and the two gases mix or diffuse into each other; but they do not mix nearly so quickly as we might expect, considering the very great velocities of the molecules. We must, however, not forget that the molecules themselves are extremely small and the number in a litre enormous. Frequent collisions take place, so that the path taken by any one molecule must be a very zigzag one, as the molecules continually rebound from each other.

In the case of a liquid the molecules are not so free to move as in a gas, but they still have a considerable amount of freedom, and probably have velocities equal to those of the gaseous molecules. They are, however, more crowded together, and the mean free path is much less. The molecules seem to adhere to each other to a considerable extent, but not nearly to the same extent as in a solid. If we consider a molecule in the interior of the liquid, this is surrounded on all sides by other molecules which attract it; but in this case the attraction is the same in all directions. There is thus no resultant force tending to move it in one direction or the other.

When we consider a molecule in the surface layer, we see that this molecule has nothing to attract it on the side remote from the body of the liquid. There is therefore a resultant pull towards the interior of the liquid. It is this pull which gives rise to what we generally speak of as *surface tension*, making the liquid behave as if it has a thin skin stretched over its surface.

Now in a liquid, just as in a gas, the molecules do not all move with the same velocity. Some of the more quickly-moving ones, that is some of those with the greatest amount of kinetic energy, will be able to break through the surface layer and get away and become ordinary gaseous molecules. This escape of molecules takes place at the free surface of any liquid contained in an open vessel, and the liquid is said to evaporate. This evaporation continues until all the liquid has disappeared. Now, as the most energetic molecules escape, the *average* kinetic energy of those remaining must be lowered—that is, the temperature of the liquid is reduced. This explains the reduction in temperature due to evaporation.

If the substance is contained in a closed vessel with a space above the liquid, the molecules leaving the surface cannot escape from the vessel, but rebound from each other and from the walls of the vessel, and ultimately return into the liquid.

Molecules continue to leave the surface, but an equilibrium

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becomes established between the number of molecules leaving the liquid and those entering, and the evaporation then apparently ceases. The number of molecules leaving the unit surface of the liquid in unit time depends on the temperature.

This is evidently so because, before a molecule can break through the surface, it must attain a certain velocity, and the velocity depends entirely on the temperature. The number returning into the liquid depends on the number per unit volume in the space above the liquid, and upon their velocity. Now, the pressure exerted by the gas depends on these two factors, and so we may state that the number of molecules returning into the liquid depends on the pressure. If we raise the temperature of the liquid, more molecules will escape and increase the number in the space above the liquid. This will raise the number striking the surface, and they will also have a greater velocity. Both these factors tend to make the pressure increase, and this increase goes on until an equilibrium is again established. Thus we see that for any given temperature there will be a corresponding definite gaseous pressure for any given liquid. This pressure we speak of as the *vapour pressure of the liquid*.

So far we have considered only the case of a gas in contact with its own liquid. Now let us consider the case of a gas in contact with another liquid. Some of the gaseous molecules may enter the liquid and be held there by the attraction of the liquid molecules. The force of this attraction will depend on the gas and the liquid used.

However, some of the molecules will escape again, and in time a state of equilibrium will be established when as many molecules leave the liquid as enter it. Now it is quite evident that the number of gaseous molecules striking the liquid surface depends on the pressure of the gas.

If we increase the pressure, the number of molecules held by the liquid becomes greater, and so we may state, in agreement with Henry's Law, that the amount of a gas which may be dissolved in a liquid is proportional to the pressure.

In the case of a mixture of gases, the number of molecules of any gas striking the surface is proportional to the pressure the gas would exert if the other gases were absent.

This pressure is called its partial pressure, and so, in agreement with Dalton's Law, we may state that in the case of a mixture of gases the amount of any gas dissolved is proportional to its partial pressure.

PHYSIOGRAPHY.

(STAGES 2 AND 3.)

THE THERMOMETER (*Continued*).

The Alcohol Thermometer.

Mercury freezes at $-39°$ C., hence we cannot use a mercury thermometer for any temperature below this. For moderately low temperatures it is usual to use thermometers in which ethyl-alcohol replaces the mercury. Pure ethyl-alcohol is a very mobile liquid at ordinary temperatures, but at about $-90°$ C. it is a thick liquid, and at $-130°$ C. it solidifies to a white mass. It may therefore be used as a thermometric substance for considerably lower temperatures than the mercury thermometer, but for very low temperatures, such as are reached in liquefying air, oxygen, and hydrogen, it is of no use, and other types of thermometers must be used.

The coefficient of expansion of alcohol is about ten times as great as the coefficient of expansion of mercury. Hence for a thermometer with a given size of bulb and a tube of given bore an alcohol thermometer is about ten times as sensitive as a mercurial one.

An alcohol thermometer is constructed in much the same way as a mercurial thermometer, but since alcohol boils at 78° C. we cannot determine the upper fixed point in the ordinary way by immersion in steam, and it is necessary to graduate the stem by comparison with a standard thermometer. Obviously an alcohol thermometer cannot be used for high temperatures. As a matter of fact, an alcohol thermometer should never be heated above about 60° C.

It will be obvious from the foregoing that alcohol thermometers possess some advantages over mercurial thermometers, but at the same time they suffer from some serious disadvantages. These we will consider in turn.

Disadvantages of the Alcohol Thermometer.

1. The boiling-point of alcohol is 78° C., and the thermometer should not be used for temperatures above 60° C.

2. Alcohol solidifies about $-130°$ C. It cannot therefore be used for temperatures below this, and is really not suitable for temperatures below about $-100°$ C., as the liquid begins to thicken at about $-90°$ C.

3. One serious disadvantage of the alcohol thermometer is due to the fact that when the bulb is warmed and the stem kept cold alcohol distils into the cold portion of the bore and condenses there, thus causing the reading as taken at the end of the liquid column to be too low. This distillation can be prevented by keeping the stem warmed up to as high a temperature as the bulb. This, however, is not always practicable.

4. In alcohol thermometers made in the laboratory the alcohol nearly always contains air, which sometimes separates in small bubbles. These should be shaken to the space above the liquid, but it is often very difficult to accomplish this. Some manufacturers add a little dry calcium chloride to the alcohol, and this is said to very largely prevent the bubbles forming.

5. The error due to the liquid in the stem of the thermometer not being heated to the same temperature as the bulb is greater even than in the case of the mercurial thermometer, as in an alcohol thermometer of the same sensitiveness as a mercury thermometer the stem contains a greater proportion of the liquid.

6. When the temperature of an alcohol thermometer has to be raised, and is again allowed to fall, a little time must be allowed to lapse before a reading is taken; as the alcohol wets the walls of the tube, the adhering liquid takes a little time to drain down.

7. Alcohol is not a very good conductor of heat, and it therefore responds somewhat slowly to temperature changes.

Advantages of the Alcohol Thermometer.

1. For a bulb of given size and tube of given bore the sensitiveness is about ten times as great as that of the mercurial thermometer, or for a given sensitiveness and a bore of given size the bulb of an alcohol thermometer need only be about one-tenth the capacity of the bulb of a mercurial thermometer. This to a great extent makes up for the low conductivity of alcohol for heat, and for its comparatively high specific heat.

2. The density of alcohol is about 0·8, as against 13·59 for mercury. Hence if an alcohol thermometer is used sometimes in a horizontal position and sometimes in a vertical one, changes in the size and shape of the bulb, due to changes in hydrostatic pressure, are not nearly so great as with the mercurial thermometer.

3. Alcohol wets the walls of the tube. This has disadvantages, as has been pointed out, but it also has advantages, as the alcohol does not stick to the glass as mercury does, and so the motion of the surface of the liquid thread is more regular than that of a mercury thread. Hence for accurate work, where the rate of change of temperature is being measured, the alcohol thermometer is preferable to the mercurial thermometer from this point of view.

4. As the relative coefficient of expansion of alcohol and glass is greater than that of mercury and glass, changes in the capacity of the bulb due to changes in the glass are less important than in the mercurial thermometer.

5. When a cold thermometer is placed in a warm liquid the thermometer is heated and the liquid cooled. Hence the final reading is not the initial temperature of the liquid. Now the specific heat of alcohol is 0·6 and its density 0·8, hence its capacity for heat is $0·8 \times 0·6 = 0·48$ as compared with water. The specific heat of mercury is ·03 and its density 13·6, and its capacity for heat $13·6 \times ·03$, or ·408 as compared with water. For a given volume, then, alcohol requires slightly more heat to raise its temperature than mercury does, but since the bulb of the alcohol thermometer need only be one-tenth the size of that of the mercury one for a given sensitiveness and a given bore, the alcohol in the thermometer will require considerably less heat than mercury. Also, since the bulb may be smaller, the glass will require less heat. This last consideration, however, is not of great importance, except in cases where the quantity of liquid whose temperature is required is small.

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Simplification. Surds.—It is difficult, if not impossible, to lay down general rules for the simplification of a given algebraical expression; it will, however, be found that any such expression may usually be reduced to its simplest form by the processes of factorisation, hence it is important that the student should have a good acquaintance with factors, more particularly the factors of binomial expressions. Sufficient information to be able to deal with simple cases may be obtained from any text-book on algebra; the treatment necessary in more difficult cases is best obtained in dealing with typical examples.

In dealing with *surds* it is generally necessary to use what is called the *complementary surd.* This may be described as a special case of factorisation, *i.e.* $a^2 - b^2 = (a - b)(a + b)$, thus as a simple example if the given surd in the denominator of a fraction is, say $\sqrt{3} - \sqrt{2}$, then it is necessary to multiply numerator and denominator by $\sqrt{3} + \sqrt{2}$.

$$\therefore \frac{1}{\sqrt{3}-\sqrt{2}} = \frac{\sqrt{3}+\sqrt{2}}{1} = \sqrt{3}+\sqrt{2}.$$

The following are a few typical cases from recent examination papers:—

Ex. 1. Find the value of k, for which $x^4+8x^3+10x^2+kx+9$ is a perfect square. (1901)

Extracting the square root in the usual manner, it will be found that the value of k to make the given expression a perfect square is -24.

Ex. 2. (*a*) If $a+\sqrt{b}$ have a square root of the form $\sqrt{p}+\sqrt{q}$ where p and q are rational, show that a^2-b is a perfect square, and that it is the square of $p-q$.

(*b*) Simplify $\sqrt{(7+3\sqrt{5})}$,

and $\sqrt{(15-4\sqrt{14})} + \dfrac{1}{\sqrt{(15-4\sqrt{14}}}$. (1901)

(*a*) $$\sqrt{(a+\sqrt{b})} = \sqrt{p}+\sqrt{q}.$$

Squaring $a+\sqrt{b} = p+q+2\sqrt{pq}$.

Hence $a = p+q$ (i.)

$$\sqrt{b} = 2\sqrt{pq}. \quad \text{(ii.)}$$

Squaring (i.) and (ii.) we obtain

$$a^2 = (p+q)^2 \quad \text{(iii.)}$$

$$b = 4pq. \quad \text{(iv.)}$$

Subtracting (iv.) from (iii.)

$$\therefore a^2 - b = (p-q)^2.$$

(*b*) Let $$\sqrt{(7+3\sqrt{5})} = \sqrt{x}+\sqrt{y}.$$

Squaring $7+3\sqrt{5} = x+y+2\sqrt{xy}$

$\therefore$ $x+y=7$

and $(x+y)^2 = 49$ (i.)

also $3\sqrt{5} = 2\sqrt{xy}$

$\therefore$ $45 = 4xy.$ (ii.)

Subtract (ii.) from (i.)

$$\therefore (x-y)^2 = 4 \text{ or } x-y=2.$$

Hence $x+y=7$

$x-y=2$

$\therefore$ $x=4\frac{1}{2}$, $7=4\frac{1}{2}$

$$\therefore \sqrt{(7+3\sqrt{5})} = \frac{3\sqrt{2}+\sqrt{10}}{2}$$

$$\sqrt{(15-4\sqrt{14})} + \frac{1}{\sqrt{(15-4\sqrt{14})}}.$$

Proceeding as in the preceding case, we obtain

$$\sqrt{(15-4\sqrt{14})} = \sqrt{8}-\sqrt{7}.$$

Substituting these values the given expression becomes

$$\sqrt{8}-\sqrt{7}+\frac{1}{\sqrt{8}-\sqrt{7}}$$

$$= \sqrt{8}-\sqrt{7}+\sqrt{8}-\sqrt{7}$$

$$= 2\sqrt{8} = 4\sqrt{2}.$$

Ex. 3. If $x(\sqrt{3}+2) = \sqrt{3}-1$, find in its simplest surd form the value of

$$\frac{1}{1-x} - \frac{1}{1+x}. \quad \text{(1902)}$$

$$x = \frac{\sqrt{3}-1}{\sqrt{3}+2};$$

$$\therefore 1-x = 1-\frac{\sqrt{3}-1}{\sqrt{3}+2} = \frac{3}{\sqrt{3}+2},$$

$$1+x = 1+\frac{\sqrt{3}-1}{\sqrt{3}+2} = \frac{2\sqrt{3}+1}{\sqrt{3}+2}.$$

Hence $$\frac{1}{1-x}-\frac{1}{1+x} = \frac{\sqrt{3}+2}{3} = \frac{\sqrt{3}+2}{2\sqrt{3}+1}$$

$$= \frac{(\sqrt{3}+2)(2\sqrt{3}+1)-3(\sqrt{3}+2)}{3(2\sqrt{3}+1)}$$

$$= \frac{(\sqrt{3}+2)(2\sqrt{3}-2)}{3(2\sqrt{3}+1)} = \frac{10+2\sqrt{3}}{33}.$$

Ex. 4. Reduce

$$\frac{7-\sqrt{7}}{(5+\sqrt{7})(\sqrt{7}-2)}$$

to its simplest form, with a rational denominator, and calculate its value as a decimal, having given $\sqrt{7} = 2{\cdot}646$. (1903)

The denominator is, by multiplication, found to be $3\sqrt{7}-3$. Hence the given expression is

$$\frac{7-\sqrt{7}}{3(\sqrt{7}-1)} = \frac{(7+\sqrt{7})(\sqrt{7}+1)}{3\times 6}$$

$$= \frac{6\sqrt{7}}{18} = 0{\cdot}8823.$$

Ex. 5. Resolve

$$bc(c^2-b^2)+ca(a^2-c^2)+ab(b^2-a^2)$$

into four factors. (St. 3, 1905)

By inspection it is seen that the first bracket will be zero when $b=c$, and similarly for the remaining brackets, hence the given expression vanishes when $b=c$, $c=a$, $a=b$.

Thus the expression is divisible by the three factors $(b-c)$, $(c-a)$, $(a-b)$. Also, the expression is symmetrical with respect to a, b, c, and is of fourth degree in those letters. Hence the remaining factor must be of the form $N(a+b+c)$, where N is a numerical quantity. The factors of the given expression are therefore

$$N(b-c)(c-a)(a-b)(a+b+c);$$

$$\therefore bc(c^2-b^2)+ca(a^2-c^2)+ab(b^2-a^2) = N(b-c)(c-a)(a-b)(a+b+c).$$

To determine the magnitude of N, let $a=0$, $b=1$, $c=2$.

Substituting these values, we obtain

$$6 = 6N; \quad \therefore N = 1.$$

Hence the factors are

$$(b-c)(c-a)(a-b)(a+b+c).$$

Ex. 6. Without multiplying out the expressions, show:—

(*a*) That $(a+b+c)^3-(b+c-a)^3-(c+a-b)^3-(a+b-c)^3$ is some multiple (M) of a, b, c.

(*b*) That $M = 24$. (1900)

Ex. 7. Extract the square root of each of the following expressions:—

(*a*) $(3x^2-11x+6)^2+12x(3x-2)^2$.

(*b*) $$\frac{6\sqrt{\frac{1}{3}}-4\sqrt{\frac{1}{4}}}{5(\sqrt{6}+\sqrt{\frac{1}{4}})}.$$ (1900)

Ans. (*a*) $(3x-2)(x+3)$; (*b*) $\pm\frac{1}{5}$.

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S. T.—Prove that

$$\operatorname{cosec} 6^\circ + \operatorname{cosec} 12^\circ + \operatorname{cosec} 24^\circ + \operatorname{cosec} 48^\circ = \cot 3^\circ - \cot 48^\circ = \frac{1}{\sqrt{2}} \operatorname{cosec} 3^\circ \,.\, \operatorname{cosec} 48^\circ,$$

and that

$$4 \sin (A+B+C) \sin (B+C-A) \sin (C+A-B) \sin (A+B-C) = 1 - \cos^2 2A - \cos^2 2B - \cos^2 2C + 2 \cos 2A \cos 2B \cos 2C.$$

(2nd Univ. R.U.I., 1905.)

$$\operatorname{cosec} 24^\circ + \operatorname{cosec} 48^\circ = \frac{1}{\sin 24^\circ} + \frac{1}{\sin 48^\circ} = \frac{\sin 48^\circ + \sin 24^\circ}{\sin 24^\circ \,.\, \sin 48^\circ} = \frac{2 \sin 36^\circ \cos 12^\circ}{2 \sin 12^\circ \cos 12^\circ \,.\, \sin 48^\circ} = \frac{\sin 36^\circ}{\sin 12^\circ \sin 48^\circ}.$$

But $\operatorname{cosec} 12^\circ = \dfrac{1}{\sin 12^\circ}$; then we have

$$\operatorname{cosec} 12^\circ + \operatorname{cosec} 24^\circ + \operatorname{cosec} 48^\circ = \frac{1}{\sin 12^\circ} + \frac{\sin 36^\circ}{\sin 12^\circ \sin 48^\circ} = \frac{1}{\sin 12^\circ}\left(1 + \frac{\sin 36^\circ}{\sin 48^\circ}\right) = \frac{1}{\sin 12^\circ}\left(\frac{\sin 48^\circ + \sin 36^\circ}{\sin 48^\circ}\right) = \frac{1}{2 \sin 6^\circ \cos 6^\circ} \cdot \frac{2 \sin 42^\circ \cos 6^\circ}{\sin 48^\circ} = \frac{\sin 42^\circ}{\sin 6^\circ \sin 48^\circ}.$$

Again, $\operatorname{cosec} 6^\circ = \dfrac{1}{\sin 6^\circ}$; therefore we have

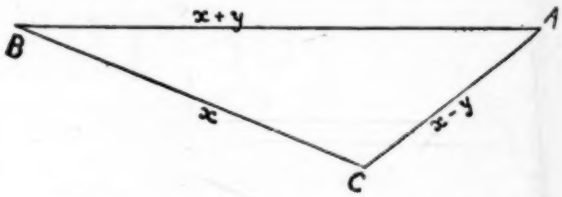
$$\operatorname{cosec} 6^\circ + \operatorname{cosec} 12^\circ + \operatorname{cosec} 24^\circ + \operatorname{cosec} 48^\circ = \frac{1}{\sin 6^\circ} + \frac{\sin 42^\circ}{\sin 6^\circ \sin 48^\circ} = \frac{1}{\sin 6^\circ}\left(1 + \frac{\sin 42^\circ}{\sin 48^\circ}\right) = \frac{1}{\sin 6^\circ} \cdot \frac{\sin 48^\circ + \sin 42^\circ}{\sin 48^\circ} = \frac{1}{2 \sin 3^\circ \cos 3^\circ} \cdot \frac{2 \sin 45^\circ \cos 3^\circ}{\sin 48^\circ} = \frac{\sin 45^\circ}{\sin 3^\circ \sin 48^\circ} = \frac{\sin (48^\circ - 3^\circ)}{\sin 3^\circ \sin 48^\circ} = \frac{\sin 48^\circ \cos 3^\circ}{\sin 3^\circ \sin 48^\circ} - \frac{\cos 48^\circ \sin 3^\circ}{\sin 3^\circ \sin 48^\circ} = \cot 3^\circ - \cot 48^\circ.$$

And $\sin 45^\circ = \dfrac{1}{\sqrt{2}}$, $\therefore \dfrac{\sin 45^\circ}{\sin 3^\circ \sin 48^\circ} = \dfrac{1}{\sqrt{2}} \operatorname{cosec} 3^\circ \operatorname{cosec} 48^\circ$.

Therefore $\operatorname{cosec} 6^\circ + \operatorname{cosec} 12^\circ + \operatorname{cosec} 24^\circ + \operatorname{cosec} 48^\circ = \cot 3^\circ - \cot 48^\circ = \dfrac{1}{\sqrt{2}} \operatorname{cosec} 3^\circ \,.\, \operatorname{cosec} 48^\circ$.

$$\begin{aligned}
&4 \sin (A+B+C) \sin (B+C-A) \sin (C+A-B) \sin (A+B-C) \\
&= \{2 \sin (A+B+C) \sin (B+C-A)\} \{2 \sin (C+A-B) \sin (A+B-C)\} \\
&= \{\cos 2A - \cos 2 (C+B)\} \{\cos 2 (C-B) - \cos 2A\} \\
&= \cos 2A \{\cos 2 (C-B) + \cos 2 (C+B)\} - \cos^2 2A - \cos 2 (C+B) \cos 2 (C-B) \\
&= \cos 2A \,.\, 2 \cos 2C \cos 2B - \cos^2 2A - (\cos^2 2C \cos^2 2B - \sin^2 2C \sin^2 2B) \\
&= 2 \cos 2A \cos 2B \cos 2C - \cos^2 2A - \{\cos^2 2B \cos^2 2C - (1 - \cos^2 2B)(1 - \cos^2 2C)\} \\
&= 2 \cos 2A \cos 2B \cos 2C - \cos^2 2A - \{\cos^2 2B \cos^2 2C - (1 - \cos^2 2B - \cos^2 2C + \cos^2 2B \cos^2 2C)\} \\
&= 1 - \cos^2 2A - \cos^2 2B - \cos^2 2C + 2 \cos 2A \cos 2B \cos 2C.
\end{aligned}$$

Rex.—The sides of a triangle are in arithmetical progression, and its area is to that of an equilateral triangle of the same perimeter as 3 is to 5. Find the ratio of the sides and the value of the largest angle. (Todhunter's *Plane Trigonometry*.)



Let ABC be the triangle, the length of AB being $x+y$, the length of BC being x, and the length of CA being $x-y$. Then the sides AB, BC, CA, are in arithmetical progression.

The perimeter of the triangle ABC is therefore

$$(x+y)+x+(x-y), \text{ or } 3x.$$

The area of ABC is given by the formula

$$\sqrt{\left[\frac{3x}{2}\left\{\frac{3x}{2}-(x+y)\right\}\left\{\frac{3x}{2}-x\right\}\left\{\frac{3x}{2}-(x-y)\right\}\right]}$$

that is, by

$$\sqrt{\left\{\frac{3x}{2}\left(\frac{x}{2}-y\right)\cdot\frac{x}{2}\left(\frac{x}{2}+y\right)\right\}}$$

that is, by

$$\sqrt{3} \,.\, \frac{x}{2}\sqrt{\left(\frac{x^2}{4}-y^2\right)} \text{ or } \frac{\sqrt{3}}{4} \,.\, x\sqrt{x^2-4y^2}.$$

Again, the area of the equilateral triangle whose perimeter is $3x$ is given by the expression

$$\sqrt{\left\{\frac{3x}{2}\left(\frac{3x}{2}-x\right)^3\right\}}$$

that is, by

$$\sqrt{\left\{\frac{3x}{2}\cdot\left(\frac{x}{2}\right)^3\right\}} \text{ or } \frac{\sqrt{3}}{4}x^2.$$

But by the question the area of the triangle ABC is to the area of this equilateral triangle as 3 is to 5. Therefore

$$\frac{\sqrt{3}}{4} \,.\, x\sqrt{x^2-4y^2} : \frac{\sqrt{3}}{4} \,.\, x^2 :: 3 : 5.$$

Hence,

$$\sqrt{x^2-4y^2} : x :: 3 : 5;$$

$$\therefore \quad \frac{\sqrt{x^2-4y^2}}{x} = \frac{3}{5};$$

$$\therefore \quad 25(x^2-4y^2) = 9x^2;$$

$$\therefore \quad 100y^2 = 16x^2;$$

$$\therefore \quad y = \frac{2}{5}x.$$

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But $AB : BC : CA :: (x+y) : x : (x-y)$;

$\therefore$ $AB : BC : CA :: (x+\frac{2}{5}x) : x : (x-\frac{2}{5}x)$;

$\therefore$ $AB : BC : CA :: \quad 7 \quad : 5 : 3.$

Then, since $\cos C = \frac{BC^2+CA^2-AB^2}{2BC \,.\, CA}$;

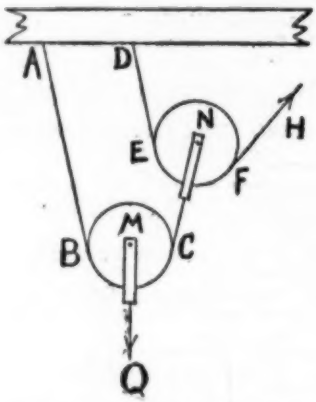
$\therefore$ $\cos C = \frac{5^2+3^2-7^2}{2\times5\times3} = \frac{-15}{2\times15} = -\frac{1}{2}$

Hence the greatest angle of the triangle ABC is 120°.

Since.—In a system of weightless pulleys, each hanging by separate strings whose fixed ends are parallel and make an angle θ with the vertical, show that the mechanical advantage is

$$\sin 2^n\theta / \sin\theta.$$

(*Tutorial Statics.*)



Let Q be the weight raised and ABCN the first string fixed at A. Then, since the tension in the string is the same throughout, the pull in BA is equal to that in CN. Therefore BA and CN make equal angles with MQ. Hence, by the question, the angle between BA and CN is equal to 2θ.

Again, if DEFH be the second string fixed at D, we have, by the question, ED parallel to BA. Therefore the angle between ED and CN is equal to 2θ. But the tension in the second string being the same throughout, the two ends ED and FH will make equal angles with NC. Hence the angle between ED and FH is double the angle between BA and CN.

It is obvious, therefore, that the angle between the two ends of any string after the first is double the angle between the two ends of the preceding string.

Now, if T_1 be the tension in the first string, we have for the equilibrium of the first pulley

$$2T_1 \cos\theta = Q.$$

Hence $$\frac{Q}{T_1} = 2\cos\theta = \frac{2\sin\theta\cos\theta}{\sin\theta} = \frac{\sin 2\theta}{\sin\theta} \quad . \quad . \quad . \quad (1)$$

Similarly, if T_2 denote the tension in the second string, we have

$$2T_2 \cos 2\theta = T_1.$$

Writing this value for T_1 in equation (1), we obtain the relation

$$\frac{Q}{T_2} = \frac{\sin 2\theta}{\sin\theta} \,.\, 2\cos 2\theta = \frac{\sin 4\theta}{\sin\theta} = \frac{\sin 2^2\theta}{\sin\theta}.$$

Hence it is obvious that if T_n denote the tension in the nth string, we shall have the relation

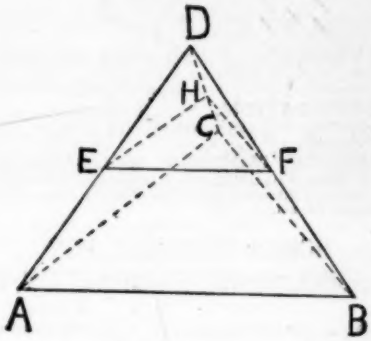
$$\frac{Q}{T_n} = \frac{\sin 2^n\theta}{\sin\theta}$$

The mechanical advantage of the system under the conditions of the question is therefore expressed by the ratio

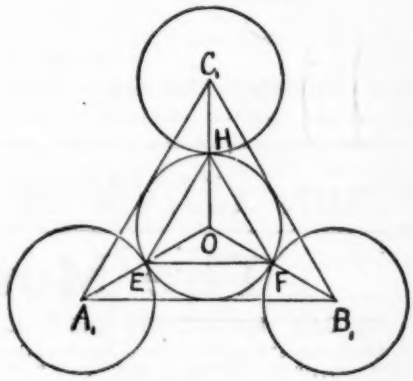
$$\sin 2^n\theta / \sin\theta.$$

W. H.—Three billiard balls are placed in contact on a rough table. A fourth equal ball is placed carefully on the top, so as to touch each of the three without disturbing their positions. Draw a sketch of the sections of the balls by a plane through the three upper points of contact, and calculate the dimensions of the sections. (Cambridge Senior Local, 1904.)

Let A, B, C be the centres of the three lower spheres and D the centre of the upper sphere. Then ABCD is a tetrahedron



each of whose edges is 2 in. long, and E, F, H, the middle points of the edges DA, DB, DC, are the three upper points of contact. Again, since E, F, H are the middle points of DA, DB, DC, and ABC is an equilateral triangle of 2 in. side, it follows that EFH is an equilateral triangle of 1 in. side. Also, since the section of a sphere by a plane is a circle, a plane through E, F, H will intersect the upper sphere in the circum-circle of the equilateral triangle EFH. Again, the plane EFH, being horizontal, will, if produced, intersect the other three spheres in circles whose centres A_1, B_1, C_1 are vertically over



A, B, C, the centres of the three lower spheres. $A_1B_1C_1$ is therefore an equilateral triangle of 2 in. side. Further, it is obvious that the equilateral triangles $A_1B_1C_1$, EFH have the same centre O, and that A_1EO, B_1FO, C_1HO are straight lines. Also, since EF is parallel to A_1B_1 and equal to half its length, it follows that A_1E is equal to EO. Similarly, B_1F is equal to FO, and C_1H to HO. Therefore the three circles described from A_1, B_1, C_1 as centres to touch the circle EFH will each be equal to the circle EFH. Hence the sections of the balls by a plane through the three upper points of contact consist of four equal circles placed as shown in the figure.

Since each of the circles is equal to the circum-circle of an equilateral triangle of 1 in. side, the radius of each circle is easily shown to be $\frac{\sqrt{3}}{3}$ inches.

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$$\begin{aligned} 930{,}000 &= 10{,}000 \times 93 \\ 74{,}400 &= 800 \times 93 \\ 1{,}860 &= 20 \times 93 \\ 744 &= 8 \times 93 \\ \therefore\ 1{,}007{,}004 &= 10{,}828 \times 93 \end{aligned}$$

Hence the quotient of 1,007,004 by 93 is 10,828.

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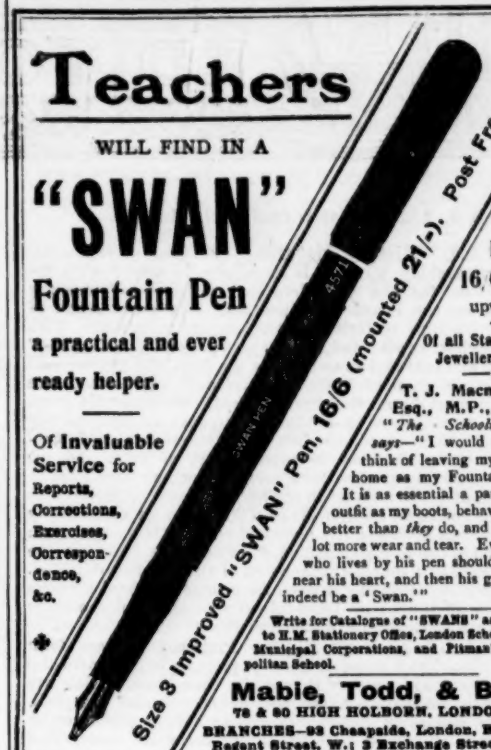

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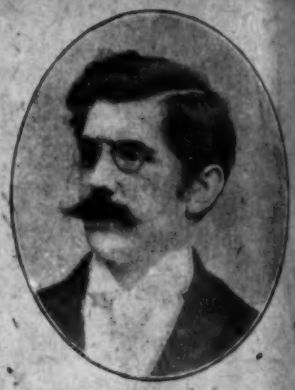

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